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5786
24

The Gift of the
Right Honorable the
Lord Napier,
of
Washington, D. C.
Rec'd 28 Aug 1837

Washington

August 23d
1857.

Sir, I have this day dispatched to your address a copy of the Life of John Napier of Merchiston, by his descendant Mark Napier, which I beg may be permitted to have a place in the Library of Harvard College.

To the Librarian of Harvard University.

Lizars sc.

John Napier of Merchiston

FROM THE ORIGINAL PRESENTED BY THE BARONESS NAPIER TO THE COLLEGE OF EDINBURGH.

MEMOIRS

OF

JOHN NAPIER OF MERCHISTON,

HIS

LINEAGE, LIFE, AND TIMES,

WITH A

HISTORY OF THE INVENTION OF LOGARITHMS.

BY

MARK NAPIER, Esq.

WILLIAM BLACKWOOD, EDINBURGH; AND
THOMAS CADELL, LONDON.
MDCCCXXXIV.

5786
24

Math 133.2

1857, Aug. 28.
Gift of
Lord Francis Napier,
British Ambassador to the U. S.
accompanied by a letter.

PRINTED BY JOHN STARK, EDINBURGH.

TO HIS MOST EXCELLENT MAJESTY

WILLIAM THE FOURTH,

KING OF GREAT BRITAIN AND IRELAND,

&c. &c. &c.

SIR,

BY your Majesty's most gracious permission, I have the honour to present to your Majesty the Domestic History of the Inventor of Logarithms. That his invention was the greatest boon genius could bestow upon a Maritime Empire is a truth universally felt, and which no person is better qualified to appreciate than your Majesty. It is a proud reflection for Britain, that she does not owe to a stranger the creation of that intellectual aid which renders your Majesty's Fleets as free and fearless in Navigation as they have ever been in Battle.

To such considerations alone am I entitled to attribute your Majesty's condescension in accepting of this work.

I have the honour to remain,

Your Majesty's humble and devoted

Subject and Servant,

MARK NAPIER.

PREFACE.

The illustrious Philosopher whose domestic history is now, for the first time, fully recorded, left many private papers besides voluminous parchments. His personal manuscripts, of course chiefly scientific, came into the possession of his third son, Robert Napier of Bowhopple, Culcreugh, and Drumquhannie, who edited his father's posthumous works. The late Colonel Milliken Napier, Robert's lineal male representative, was still in possession of a mass of the Culcreugh papers at the close of last century. The Colonel was no antiquary, and, like most of the descendants of the great Napier, chiefly evinced his philosophy in a supreme indifference to sabre and gun-shot wounds, in the service of his country, which were liberally bestowed upon him during twenty-two years of a military career in every quarter of the globe. His excellent lady, from whom I have the following fact, upon one occasion, before accompanying her husband from home, deposited the venerable relics of the Philosopher, including a portrait of him, and a Bible with his autograph, in a chest which was placed for safety in a garret of their house of Milliken in Renfrewshire. During their absence the house was burnt, and the precious deposit perished. It is to be regretted that the present attempt had not been made

before this dilapidation of the materials occurred. Still, however, much remained which it was desirable to rescue from the chapter of accidents. In particular, two manuscript treatises, one upon Arithmetic, and the other upon Algebra, composed by Napier, had been previously presented to Francis V Lord Napier, by William Napier, fifth of Culcreugh, and thus escaped the destruction of the other papers. The late Lord (Francis VII.) saved these manuscripts from decay, very obviously commencing, and he notes upon a blank leaf, " finding them in a neglected state amongst my family papers, I have bound them together, in order to preserve them entire." The reason of this remnant having passed to the noble branch of the family is manifest. Francis V Lord Napier, a most accomplished nobleman, (who in the year 1761 procured, at his own expense, a survey, plan, and estimate for a navigable canal to form a communication between the rivers Forth and Clyde, and which idea was subsequently carried into execution upon a great scale,) had turned his elegant and comprehensive mind towards the composition of a biographical work worthy of the memory of his great ancestor. The fact is curiously recorded. Sir Alexander Johnston, late Chief-Justice of Ceylon, and now of his Majesty's Privy-Council, was examined before the committee on the affairs of the East India Company in July 1832, when he gave some interesting evidence relating to the Hindoo governments. The following extract from that evidence will inform the reader of the unexpected termination of Lord Napier's literary project: " Were you acquainted, while in Ceylon, with the late Colonel C. Mackenzie, the Surveyor-General of all India, and with the collection which he made of materials for writing a history of India ? I was intimately acquainted with him from my earliest youth, and I was in constant communication with him all the time I was in Ceylon, from 1802 to 1818, upon subjects connected with the history of India and of that island, and had frequent occasion to refer for information to his valuable collection of ancient inscriptions and historical documents.

Be so good as to explain the circumstances which first led Colonel Mackenzie to make this collection, and those which led the Bengal government after his death to purchase it from his widow? Colonel Mackenzie was a native of the island of Lewis; as a very young man, he was much patronized, on account of his mathematical knowledge, by the late Lord Seaforth, and my late father, Francis, the fifth Lord Napier of Merchiston. He was for some time employed by the latter, who was about to write a life of his ancestor, John Napier of Merchiston, the Inventor of Logarithms, to collect for him, with a view to that life, from all the different works relative to India, an account of the knowledge which the Hindoos possessed of mathematics, and of the nature and use of Logarithms. Mr Mackenzie, after the death of Lord Napier, became desirous of prosecuting his oriental researches in India. Lord Seaforth got him appointed to the engineers on the Madras establishment in 1782, and gave him letters of introduction to the late Lord Macartney, the then Governor of that Presidency, and to my father, who held a high situation under his Lordship at Madura, the ancient capital of the Hindoo kingdom, described by Ptolemy as the *regio Pandionis* of the peninsula of India, and the ancient seat of the Hindoo college. My mother, who was the daughter of Mr Mackenzie's friend and early patron, the fifth Lord Napier, and who, in consequence of her father's death, had determined herself to execute the plan which he had founded of writing the life of the Inventor of Logarithms, resided at that time with my father at Madura, and employed the most distinguished of the Brahmins in the neighbourhood in collecting for her from every part of the peninsula the information which she required relative to the knowledge which the Hindoos had possessed in ancient times of mathematics and astronomy. Knowing that Mr Mackenzie had been previously employed by her father in pursuing the literary inquiries in which she herself was then engaged, and wishing to have his assistance in arranging the materials which

she had collected, she and my father invited him to come and live with them at Madura early in 1783, and there introduced him to all the Brahmins and other literary natives who resided at that place." No life of Napier, however, was destined to result from these spirited proceedings, which gave rise to the celebrated Mackenzie Collection ; and, Sir Alexander adds in his evidence, " the Marquis of Hastings purchased the whole collection for the East India Company from Colonel Mackenzie's widow for L. 10,000, and thereby preserved for the British Government the most valuable materials which could be procured for writing an authentic history of the British empire in India." Unfortunately the papers of the Honourable Mrs Johnston were also consumed by fire, an element that has been severe upon the materials for our Philosopher's biography. The late Earl of Buchan, towards the close of last century, put together a few quarto pages of meagre and inaccurate biography, which he called the Life of Napier, and to this was added an able but dry analysis of his published mathematical inventions by Dr Minto. This work has done more harm than good to the subject, as, from its imposing shape and title, it has given rise to a vague impression that nothing further could be known or said about Napier, and may have deterred others, better qualified for the task than I can pretend to be, from exerting themselves to do justice to his memory.

The late Lord Napier compiled with great pains and accuracy a digest of his charters and private papers, composing a genealogical account of his family, which remains in manuscript. This his Lordship communicated to Mr Wood, and the substance of it will be found in the account of the family of Napier contained in that gentleman's edition of Douglas's Peerage. From that source chiefly the slight biographical notices of the philosopher, lately published, are derived. Still his very curious mathematical manuscripts remained unexamined, and some of the most interesting and characteristic particulars of his history unrecorded.

The present Lord Napier having allowed me unlimited access to his family papers, and encouraged me throughout this undertaking with his kind and intelligent co-operation, I have done my best to supply the desideratum. In some respects a philosopher would have been the most proper biographer of Napier, particularly in the analysis of his unpublished treatises, to which I can scarcely hope to have done justice beyond the fact of making their contents known. But there were antiquarian difficulties to encounter, both in mastering the contents of his manuscripts, and in the other researches upon which these Memoirs are founded, to which mathematicians are little inclined. The world had waited long enough for a scientific life of Napier, and while the Logarithms, most amply and admirably commented upon by illustrious foreigners, were continually adding glory to the land of their birth, the very knowledge of who invented them seemed to be escaping from the popular literature of his own country. My object has been not only to record every fact of interest regarding the great Napier, but to exhibit a picture of him relieved upon the dark ground of his times,—to connect him with the political and religious history of his country, no less than with the history of science.

It is a curious fact, and affords one of several instances in which the memory of our Philosopher has been strangely neglected, that no portrait of him has been engraved in Mr Lodge's Portraits of Illustrious Personages of Great Britain. Bacon is there, and Newton, but not Napier. Yet that brilliant publication includes John Knox, though the engraving, meant to represent him, is taken from an old anonymous portrait in Holyroodhouse, certainly not of John Knox, holding a pair of compasses over a chart. A most authentic portrait of Napier, however, and in excellent preservation, belongs to the College of Edinburgh. The record of donations to that University proves that it was presented by Margaret, Baroness of Napier in her own right, to whom the honours opened in 1686. There can be no doubt of its originality. It bears the shield of

arms and the initials of the philosopher with the date 1616, the year before his death; and also his age, 67, all of which are obviously contemporary with the rest of the painting. It has been partially engraved for this work, including a sketch, however, of all the minor details. Who painted it is a difficult question, as the date is prior to the era of Jamieson, and during a very rude age of portrait painting in Scotland. Yet, though defective in perspective, it is well coloured, and altogether a noble portrait. I have chosen it for this work in preference to another, unquestionably original, of the same size, belonging to Lord Napier, and which has never been out of the family. But his Lordship's is not in such good preservation, and, though quaint and interesting, is a ruder specimen of art. The countenances are very similar, but the paintings quite different. They are seated in different chairs, and in a different dress and attitude. The upper part of the figure in Lord Napier's is clothed in a close tunic of black, with a black cowl concealing the hair and half of the brow. The lower part of the figure seems enveloped in drapery, and the left hand holds a book at a table. An etching of it was intended to illustrate this preface, and also one from a dilapidated portrait, in Lord Napier's gallery, of the Philosopher's first wife; these etchings, accordingly, are alluded to in the Memoirs, but have not been inserted, as the details of the old paintings were doubtfully made out. Mr Napier of Blackstone possesses a half-length portrait of the Philosopher with the cowl, which has very much the air of an original. The same may be said of one in possession of Aytoun of Inchdernie, whose ancestor was connected by marriage with the family of Merchiston. This also has the cowl. The late Lord Napier acquired a very original-looking half-length of him without the cowl, the history of which I cannot trace. There is another of the same size with the cowl, belonging to one of the law professors in Edinburgh, which I have heard called an original of the Baron from the pencil of Jamieson. This would be an exceedingly interesting portrait. But could the Scot-

tish Vandyke have painted any portrait in Scotland until some years after the Philosopher's death? Unquestionably he painted the first Lord Napier. This portrait, of which an engraving is given in the Memoirs, is included in the catalogue of Jamieson's works, and is still in possession of Lord Napier. An original of the great Napier by the same master would scarcely have been suffered to wander out of the family.* Jamieson, however, may have copied some of these heads of the Philosopher when he painted his son. The engraving of Mary Queen of Scots will be contemplated with great interest. Among the various portraits of her, with more or less claims to originality, none possess higher than this, though never until now publickly noticed. It is not a copy from any other known, and all the characteristics are in favour of its perfect originality. Upon the back of it there is, in the hand-writing of the late Lord Napier, "This picture of Mary Queen of Scots, supposed to be painted when she was about twelve years old, has ever been considered an original picture, and has been in the possession of the family of Napier for many generations. Mr David Martin, at the desire of Lord Napier, stretched it on new

* A biographical notice of our Philosopher, contained in the *Library of Entertaining Knowledge*, 1830, is at great pains to state that he was not Lord Napier; but, adds a note, hitherto uncontradicted, which has a much greater tendency to confuse his genealogy, "Professor Napier of Edinburgh, who is descended from Lord Napier, is in possession of the set of bones used by his great ancestor."—Vol. viii. p. 56. I would not have noticed a capricious adoption of the surname of Napier by the Professor of Scots Law Conveyancing in Edinburgh, (also editor of the Encyclopædia Britannica,) whose proper surname is Macvey, were it not that the publication and wide diffusion of the genealogical error quoted above might impress, foreigners at least, with the notion that a scion of Merchiston, perhaps the philosopher's representative, occupies a learned chair in the University of Edinburgh. A very minute acquaintance with the history of Napier, in all its branches, does not enable me to record the most distant genealogical connection between the family of Napier of Merchiston and any one of the name of Macvey; or, however honoured the Napier tree might be by the acquisition, that it is possible that the Professor can be descended from any Lord Napier. Lord Napier possesses a very primitive set of those ingenious instruments of calculation "Neper's Bones," but framed of card disposed upon rollers in an oaken box, the figures upon which appear to be in the handwriting of the philosopher or his son Robert. Like the wood of the true cross, however, the identical original bones may have been scattered far, and infinitely multiplied.

canvass and cleaned it 1787." It will be seen that there were many channels through which such a relic might reach the family of Merchiston. The likeness is perfectly preserved in the engraving, which, however, cannot convey the delicate and youthful complexion, Dr Robertson says, "Her hair was black—her eyes were a dark-grey;" and had this been written in any other spirit than that of romance, it would contradict the authenticity of Lord Napier's picture, where the hair is yellow, and the eyes of a decided hazel or chesnut-colour. But Sir James Melville says expressly, that her complexion was fair; and "Beal, the clerk of the Privy-Council, who was directed by Cecil to see and report the death of the Scottish Queen, describes her as having *chesnut-coloured* eyes."—*Chalmers*. The autograph attached is taken from an original letter of the young Queen (when about the age represented in this portrait) to her mother, preserved in the Register-House. The Portrait of Dr Napier, the warlock of Oxford, is exceedingly characteristic. There can be no doubt that he and the Philosopher were brothers' children, that fact being recorded by the first Lord Napier, who could not be mistaken as to the family of his own granduncle.

I had intended to have given a complete statement, in the Appendix, of the Lennox Case for Merchiston, proving the Philosopher's, and consequently Lord Napier's, right to that ancient Earldom; but having occupied more space with the abstract of Napier's Algebra than I had anticipated, the Case, with genealogical trees of the family, &c., is reserved for publication in another shape. I have retained, however, so much of it as may suffice to meet certain errors that have crept into the history of Scotland.

August 1834.

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I.—Charter Seals proving that the old Earls of Levenax did not carry the Cross engrailed.

1. 2. The Signet and Charter Seal of Malcolm V. Earl of Levenax, preserved in the Chapter-House at Westminster. This was the friend of King Robert Bruce, and he who died at Halidonhill 1333.

3. Seal of John Stewart Lord Dernely, First Earl of Levenax of the usurping Race, to a Contract of Agreement with Elizabeth Menteith and Archibald Naper, her son, 19th May 1490, *penes* Napier.

4. Seal of his son Mathew, Second Earl of that Race, to a Precept of *Clare Constat* to Archibald Naper, 8th January 1509, *penes* Napier.

5. Seal of Mathew Earl of Levenax, Father of King Henry Darnley, to a Precept of Seisin to Adam Colquhoun, 10th November 1543.

N. B.—The above prove both that the old Earls of Levenax carried the saltier plain, and also contradict Mr Nesbit, who asserts, that the *surtout* carried by the Race of Dernely was "argent a saltier *engrailed* betwixt four roses."

6. Seal (probably the only one extant) of Robert Stewart Bishop of Caithness, created Earl of Lennox by James VI., 16th June 1578. Resigned that Earldom 5th March 1579 and was created Earl of March. This seal is attached to a Trust-Deed dated 11th December 1578, *penes* Napier, and is the earliest instance of an Earl of Lennox carrying the cross engrailed.

7. Seal of Ludovick, Second Duke of Lennox, from a cast by Mr Laing from the original silver.

II.—Charter Seals proving that John Napier, Third of Merchiston, did not take the coat of Levenax from his Marriage with the Heiress of that Earldom, but from his paternal Ancestors.

1. Seal of Alexander, First Napier of Merchiston, deed 1453.

2. Seal of Alexander, Second Napier of Merchiston, deed 1452. *(vita patris.)*

3. Seal of John, Third Napier of Merchiston, deed 1482.

4. Seal of Archibald, Fourth Napier of Merchiston, deed 1512.

5. Seal of Alexander, Fifth Napier of Merchiston, (son of Alexander, killed at Flodden *vita patris*, whose seal I cannot find,) deed 1543.

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The Wood-Cuts at the commencement and end of the History of the Invention of Logarithms are fac-similes from the original work published by Andrew Hart.

ERRATA.

Page 492, note †, *for* moetur *read* movetur, *and for* motur describir *read* motu describi.
—— 203, line 31, *for* perimur *read* ferimur.
—— 330, —— 19, *for* extitit *read* excidit.
—— 374, —— 13, *for* and was followed by *read* followed by.
—— 384, —— 8, *for* semicolon *put* a period, and close quotation.
—— 431, —— 11, *for* framed his *read* framed some of his.

LIFE

OF

JOHN NAPIER OF MERCHISTON.

CHAPTER I.

THAT the life of a philosopher affords few incidents for his biography, is remarked in every attempt to satisfy the curiosity of the world as to the domestic habits of such men. Even with regard to Sir Isaac Newton, who lived in an age and country the ameliorated state of which had multiplied social relations, a regret has been expressed, that he must be constantly viewed in connection with the progress of science, and scarcely ever in communion with human nature.

If this be true of Newton, how much more so is it of him whom the common people of his day used to designate by the mysterious epithet of the "Marvellous Merchiston,"—who was born a century before the English philosopher, in the most savage age of a barbarous land, where betwixt himself and contemporary barons, much the same sympathies existed that Daniel enjoyed in the lion's den.

There is this advantage, however, in the antiquity of the present subject, that slight notices become valuable, particularly if they involve picturesque relations to the history of the country. I do not despair of being able to satisfy the reader's curiosity as to the private life and habits of our great philosopher, more fully than he may have anticipated. But this it is hoped, will also add something to the interest, that the lineage which Napier represent-

ed, and the relatives among whom he was reared, connect in a remarkable manner with the annals of Scotland.

It may be said that his biography can be neither more nor less than a chapter of human knowledge in its loftiest departments; and it is usual to dismiss the mortal genealogies of the sons of science with almost contemptuous brevity. But the pride of intellect which affects a supercilious disdain for an historical lineage or hereditary honour, if less absurd, is perhaps more mischievous than the pride of ancestry. Applied to the history of philosophers the proposition seems questionable, that it is "more honourable to have achieved fame and eminence without the advantages of high birth, than with their assistance."* Necessity is the mother of invention, and poverty has been found the most faithful nurse of genius. Napier incurred a greater risk of never attaining his throne in letters, from the wealth of his family, and the courtly and historical connections of his house, than if his parentage could only have been traced to a hovel. Ramus was reared as a shepherd, Ben Jonson as a bricklayer, Longomontanus was the son of a labourer, Metastasio of a common mechanic, Hadyn's father was a wheelwright, Linnæus was bred a shoemaker, and the fiery spark of Franklin's genius was struck from the forge of a blacksmith. Without multiplying examples, or taking any from our own country, where the instances are too modern to be within the pale of courteous observation, it may be safely said, that the annals of letters are gorged with illustrious proofs that the sons of the lowly may become the lights of the world.

Yet the illustrious transatlantic philosopher whom we have named, while expressing exultation in his victory over the difficulties of an inferior origin, evinces at the same time an aristocratic anxiety to surround the smithy of his ancestors with the halo of antiquity and hereditary right. "From the bosom of poverty and obscurity," says he, in a letter of autobiography to his son, "in which I drew my first breath and spent my earliest years, I have raised myself to a state of opulence, and to some degree of celebrity in the world." Then he adds, "one of my uncles, desirous like myself of collecting anecdotes of our family, gave me some notes, from which I have derived many particulars respecting *our ancestors*. From these I learn, that they had lived in the same village, (Eaton in Northamptonshire,) upon a freehold of about thirty acres, for

* The Pursuit of Knowledge under Difficulties, published by the Society for the Diffusion of Knowledge.

the space at least of *three hundred years*. How long they had resided there prior to that period, my uncle had been unable to discover,—probably ever since the institution of surnames, when they took the appellation of Franklin, which had formerly been the name of a particular order of individuals. This petty estate would not have sufficed for their subsistence had they not added the trade of a blacksmith, which was perpetuated in the family down to my uncle's time, the eldest son having been uniformly brought up to this employment,—a custom which both he and my father observed with respect to their eldest sons. In the researches I made at Eaton, I found no account of their births, marriages, and deaths, earlier than the year 1555; the parish register not extending farther back than that period. This register informed me that I was the youngest of the *youngest branch of the family*, counting five generations," &c.

But in the British isles at least, the cottage school of knowledge is not unrivalled; nor can it be said, that with us genius only flashes, like the lightning, from the bosom of obscurity. While such names as Bacon, Boyle, and Byron, illustrate the aristocracy of England and Ireland, those of Napier and Scott belong to the feudal history of their country. * The magnitude of these examples outweighs the multitude opposed; and the contemplation is consolatory and wholesome to the higher classes of society.

The instance of Napier is peculiarly striking. In his own country, where he has no monument but his works, he as far excels all her philosophers in a comparison of intellectual achievement, as in the curious and quaint antiquities of his race; and of him it is that England's greatest historian has recorded an estimate, true to this hour, that he was " the person to whom the

* I have not instanced Sir Isaac Newton, because his mighty name belongs to the debateable land in this question. According to his latest biography, neither England nor Scotland, the aristocracy nor the people, can positively claim him. Sir David Brewster, after stating the *pros* and *cons* on the subject, adds, " all these circumstances prove that Sir Isaac Newton could not trace his pedigree with any certainty beyond his grandfather; and that there were two different traditions in his family,—one which referred his descent to John Newton of Westby, and the other to a gentleman of East Lothian, who accompanied King James VI. to England. In a letter addressed to me by the learned George Chalmers, Esq. I find the following observations respecting the immediate relations of Sir Isaac: ' The Newtons of Woolsthorpe,' says he, ' who were merely yeomen farmers, were not by any means opulent. The son of Sir Isaac's father's brother was a carpenter called John,' " &c.—*Brewster's Life of Newton.*

title of a GREAT MAN is more justly due than to any other whom his country ever produced." *

To verify this eulogy—which, since the career of one whose glory is so bright upon his recent grave might be thought no longer due—is the chief object of the following Memorials. In the first place, however, we must indulge in a chapter or two of historical reminiscences of the descent of our great philosopher, and the family connections in the midst of whom his own quiet progress to maturity and fame was completed. Nor is this to gratify a local vanity, or the mere lovers of genealogy. Two of the brightest stars in the galaxy of France have turned with disappointment from the difficulty of obtaining even the miserable records which this country affords of its greatest philosopher. "On connaît peu de circonstances," (says Delambre,†) "de la vie de Néper; il était Ecossais, baron de Merchiston."—And Montucla,‡ after recording of his family and personal history the little he knew, which involved two errors, adds, "Je sais qu'il y a une vie de Néper publiée, il y a peu d'annees à Edimbourg. Mais c'est en vain que j'ai tenté de me la procurer. Il est bien plus difficile d'obtenir un livre de Londres que de Petersbourg, quoique cette derniere ville soit six fois eloignée de nous."

John Napier was not the man to have obviated by his own researches, this dearth of information with regard to his domestic history, and we must do for him what the great American did for himself.

"Alexander Napare," the first of Merchiston, acquired that estate before the year 1438, from James I. of Scotland, § was provost of Edinburgh in 1437, and otherwise distinguished in that reign. His eldest son, also Alexander, became in his father's lifetime comptroller to James II., and ran a splendid state career under successive monarchs.

But whence these Napiers came, though obviously at this early period a wealthy and distinguished family, has hitherto baffled genealogical inquiry. Peerage writers, not easily discomfited, have without any authority, boldly traced their descent from "Johan le Naper del Counte de Dunbretan," (one of those who swore fealty to Edward I. in 1296, and defended the Castle of

* Hume's History of England, vii. 44.

† Histoire de l'Astronomie Moderne, par M. Delambre, &c. &c. &c. T. i. p. 491.

‡ Histoire des Mathematiques, par J. F. Montucla, de l'Institut National de France, T. ii. p. 15.

§ See Note (A.)

Stirling against that monarch in 1304;) and thence through a variety of William and John de Napers of feudal celebrity. After a long and arduous search through authentic records, I find there exists no authority for this genealogy.

Under these circumstances, we can do no less than attend to the Legend of Merchiston, as illustrated by the truest of all records so far as it goes, the heraldic language of ancient seals.

From time immemorial, that family cherished a tradition, that one of their lineal male ancestors was a younger son of a Scottish Earl of the ancient race of Levenax. In the imperfect shape in which the tradition has been transmitted, it must rank with those fanciful legends which compose the pleasant apocrypha of profane history. "The Hay of Longcarty, who bequeathed his bloody yoke to his lineage,—the dark-gray man who first founded the House of Douglas," *—cause fastidious antiquaries to shake their heads, yet still keep their own in the romance of Scottish history. The legend of Napier is of the same description, but has been solemnly recorded in the Heralds' books of London, owing to circumstances which, as they are not generally known, I shall narrate.

James VI., of facetious memory, had no objection to enrich his coffers by an indiscriminate distribution of knighthoods and higher honours. "Hold up thy head man, thou hast less need to be ashamed than I, sure," was an encouraging exclamation of his to a shamed-faced country gentleman about to be knighted. It was a prize to him to discover in one individual the rarely combined qualities of wealth, good Scotch extraction, and a desire to pay for further honours with Sterling coin. Such a *rara avis* occurred in the person of a cadet of Merchiston in the year 1612. Robert Napier, a cousin-german of the great John, had amassed riches abroad as a merchant. At the same time the services of his fathers to the royal house, entitled him to look for honours and preferment at home. Archibald, the philosopher's eldest son afterwards first Lord Napier, was at this time a gentleman of the bed-chamber to King James, but in no condition to purchase aggrandizement, as notwithstanding his father's great estates in Scotland, the young laird had become involved in debt from his long attendance on the avaricious monarch.† James himself was well aware that the Napiers of Merchiston, independently of their pretensions to a male descent from Lennox, represented through a female a branch

* Sir Walter Scott.

† Original letter of Archibald Naper to Sir Julius Cæsar in 1613.

of that earldom collateral to his own descent through Darnly.* So he knew his man, and rejoiced in the wealthy merchant, who claimed the honour of a baronetcy and was ready to pay for it. Sneers and whispers, expressive of an outraged aristocracy, went round the circle of his courtiers, who were particularly jealous when the sword of honour was about to descend upon the shoulders of a Scotchman. But the king had less reason to be ashamed than usual. He attested the birth and breeding of the candidate with an oath which has become familiarly characteristic of his energetic mood. He declared " by his saul," that the family to which Robert Napier belonged had ranked with the aristocracy for more than 300 years. William Lilly, " the last of the astrologers," tells this anecdote in his gossipping and graphic manner. " A word or two of Dr Napper," says he, " who lived at great Lindford, in Buckinghamshire, was parson, and had the advowson thereof. He descended of worshipful parents, and this you must believe, for when Dr Napper's brother, Sir Robert Napper, a Turkey merchant, was to be made a baronet in King James' reign,† there was some dispute whether he could prove himself a gentleman for three or more descents. ' By my saul,' saith King James, ' I will certify for Napper, that he is of three hundred years' standing in his family; all of them, by my saul, gentlemen.' " ‡

* In " an Abstract of the Evidence adduced to prove that Sir William Stewart of Jedworth, the paternal ancestor of the present Earl of Galloway, was the second son of Sir Alexander Stewart of Darnly," printed in London 1801, is the following observation: " King James (VI.) was himself descended from the family of Lennox, and was well versed in its history; for he had during his reign employed several persons to trace its genealogy. It was a subject with which he was well acquainted, and which he took particular pleasure to contemplate."

† In Sir William Dugdale's Usage of Arms, printed at Oxford 1682, I find in his catalogue of Baronets created by James VI. November 25, 1612: " Sir Robert Naper, *alias Sandy*, of Lewton-How, Knight;" and of those created by Charles II., under date March 4, 1660, " John Napier, *alias Sandy*, Esq. with remainder to Alexander Napier, &c. with remainder to the heirs-male of Sir Robert Napier, Knight, grandfather to the said John; and with precedency before all baronets made since the four-and-twentieth of September, anno 10, Regis Jac., at which time the said Sir Robert was created a baronet, which letters patent so granted to the said Sir Robert Napier were surrendered by Sir Robert Napier, (father of the said John and Alexander,) lately deceased; to the intent that the said degree of baronet should be granted to himself, with remainder to the said John and Alexander." It appears from Dugdale that the Turkey merchant was a knight, and of Lewton-How, before he was created a baronet in 1612. The alias of " Sandy" was acquired from the favourite name of Alexander in the Merchiston family.

‡ This did not escape Sir Walter Scott, who, while describing the old castle of Merchiston in his Provincial Antiquities, thus comments upon the anecdote in reference to the leaning of the

The king's asseveration seems to have silenced the courtiers for the time; but in the year 1625, immediately after the demise of that monarch, and when Sir Archibald Napier was residing on his estate in Scotland, his cousin Sir Robert deemed it prudent to put his genealogical pretensions formally upon record in the Heralds' books, beyond the reach of courtly cavil. He accordingly applied to Merchiston, as the head of his house, for an authentic certificate of cadency; and the document with which Sir Archibald favoured him under his own hand contains the only written statement of the legend alluded to that I can discover. It is to be regretted that King James answered so readily and lustily for the Turkey merchant; John Napier, the philosopher, might otherwise have been applied to for this document, which would then have entered the English records in the words of the inventor of Logarithms.† As it is, we have the tradition transmitted by him to his son, who first gave it publicity under the circumstances narrated.

Sir William Segar was at the time principal king-at-arms for England. He was the very preux chevalier of heraldry, and lived amid a halo of its most brilliant recollections. In 1586, he had walked as portcullis pursuivant at the

inventor of Logarithms to the occult sciences. "It is curious to observe, that amongst the professors of astrology and other occult sciences who abounded in England in the beginning of the sixteenth century, was a Dr Napper; this person was probably of the stock of the Scottish Napiers,—it is possible, however, that the British Solomon tendered his evidence thus readily, because his palm itched for the baronet's fees." Our illustrious author was not aware of the near relationship existing betwixt the great Napier and this celebrated astrological doctor, whose portrait is still preserved at Oxford, though with a sort of longing for the fact, he ventured a conjecture that they belonged to the same stock. They were brothers' sons, and I shall elsewhere have a word or two of Lilly and Dr Richard Napier.

† The philosopher certainly knew the tradition, and seems to have laid some stress upon it. His commentaries on the apocalypse were translated at Rochelle; and the edition 1602 has on the title-page, "*Par Jean Napeir (c. a. d.)* NOMPAREIL, *Sieur de Merchiston, reueue par lui meme.*" The commendatory verses attached to his works generally turn upon the words "nulli par," or "impar." The famous civilian *Franciscus Baldiunus* wrote a Latin stanza upon Napier, the first couplet of which embodies the allusion,—

Scotia te genuit phocis Parnassia fovit
Estque *impar* versum nomen (Apollo) tibi.

"In the year 1705, Sir Isaac Newton gave into the Heralds' Office an elaborate pedigree, stating upon oath that he had reason to believe that John Newton of Westby, in the county of Lincoln, was his great-grandfather's father," &c. The pedigree was accompanied by a certificate from Sir John Newton of Thorpe, Bart.—*Brewster's Life of Newton*, p. 347.

thrilling pageantry of the state funeral of Queen Mary. He became successively Somerset, Norroy, and garter herald; and in 1603, was honoured with the commission to carry the garter to Christian IV. of Denmark. In 1612, he invested the Prince of Orange with the same illustrious insignia, who presented him in return with his picture set in diamonds, and a chain of gold weighing six pounds. James VI. conferred upon him the honour of knighthood.* Such was the worthy to whom, at the request of the Turkey merchant, Sir Archibald Napier (by this time deputy-treasurer for Scotland, and a privy-councillor,) transmitted a curious, though very imperfect, genealogical history of the family, which Sir William recorded with the profound respect and heraldic flourishes wherein his duty and his delight at once consisted.

Some account of the contents of this document will be found in the genealogical note at the end of the volume.† Here it is sufficient to extract the words of Sir Archibald which refer to the Lennox origin of his house.

"One of the ancient Earls of Lennox in Scotland had issue three sons; the eldest, that succeeded him to the Earldom of Lennox; the second, whose name was Donald; and the third, named Gilchrist. The then King of Scots having wars, did convocate his lieges to battle, amongst whom that was commanded was the Earl of Lennox, who, keeping his eldest son at home, sent his two sons to serve for him with the forces that were under his command. This battle went hard with the Scots; for the enemy pressing furiously upon them, forced them to lose ground until it came to flat running away, which being perceived by Donald, he pulled his father's standard from the bearer thereof, and valiantly encountering the foe, being well followed by the Earl of Lennox's men, he repulsed the enemy and changed the fortune of the day, whereby a great victory was got. After the battle, as the manner is, every one drawing and setting forth his own acts, the king said unto them, ye have all done valiantly, but there is one amongst you who hath NA-PEER; and calling Donald into his presence, commanded him, in regard of his worthy service and in augmentation of his honour, to change his name from Lennox to Napier, and gave him the lands of Gosford and lands in Fife, and made him his own servant, which discourse is confirmed by evidences of mine wherein we are called Lennox *alias* Napier."

* He died in 1633, and left, as monuments of his science,—An Institute of Honour, Military and Civil, in four books, 1602. Honores Anglicanæ, &c. 1602. Baronagium Genealogicum, or the Pedigree of the English Peers, &c.

† Note (A.)

This story is told, I speak with deference, rather in the historical vein of Sir Walter Scott than of Lord Hailes, and, perhaps, deserves to rank no higher in authentic history than the legends of Douglas, or Dalyell, or Hay, or Forbes.* But the Lennox descent may be true independently of the legend, "though" (says Sir Archibald) "this is the origin of our name, as, by tradition from father to son, we have generally, and without any doubt, received the same;" an assertion justified by a fact not adverted to in his own narrative, that the charter-seals of his lineal paternal ancestors, since at least the year 1400, had all proclaimed that very descent throughout an age of heraldry, and for more than two centuries before it was thus recorded in 1625.

To a charter of the first Alexander Napier of Merchiston, dated in 1453, there is appended a seal bearing his name and arms in such preservation as to be distinctly read.† The device upon the shield is, in heraldic language, "a saltier engrailed, cantoned with four roses,"—a chaste and simple cognizance, well known to armorists as that carried by the old Earls of Levenax; with this exception, however, (not attended to by our modern heralds and genealogists,) that those Earls bore the saltier plain, never engrailed.

* See Nisbet's Heraldry for an account of these fanciful derivations and their legends. He has not that of Napier; but I was led to trace the history of it so far as I could, in consequence of finding that one of the most illustrious men of modern days, whose commentary on the Logarithms is the best and most scientific that has appeared, M. Delambre, did not disdain to advert to the legend in the midst of his profound speculations.

"On a varié," says he, "sur l'orthographe du nom de Néper, qu'on a écrit Napier, et Nepair; on croit ce dernier mot l'équivalent de *peerless*, *sans pair*, donné à l'un de ses ancêtres; mais il s'est appelé lui-même Neperus dans son ouvrage. Nous avons suivi l'usage constant des écrivains Français qui écrivent Néper."—*Astronomie Moderne*, p. 506, v. i. A multiplicity of original signatures of the great Napier occur among the family papers. His marriage settlements in 1572 are signed Jhone Neper; the same in many other deeds down to 1610. His contract with Logan of Restalrig preserves in the signature the same orthography; and so in a letter to his father about the close of the 16th century. But one to his son in 1608 is signed "Jhone Nepair." All the deeds after that date signed by him have the latter signature. His letter to James VI. prefixed to his theological work is signed "John Napeir." 1*st Edit.* 1593.—"Neper" is the oldest mode. His great-great-great-grandfather John, who married the heiress of Lennox, and who (mirabile dictu) could write his name in the 15th century, so spelt it. His own children, who sign deeds along with him, use every mode *except* Napier, which is comparatively modern.

† See Note (A.)

Other contemporary races of Napier, of whom the Dumbartonshire barons already mentioned are the chief, carried coat armour totally different. These were the Napiers of Kilmahew, whose estates lay in the Lennox country, and who were vassals of that earldom. But they did not assume a single bearing indicative even of the patronage of Lennox. Kilmahew is the most ancient family of the name of Napier on record in Scotland; and their armorial bearings were *gules*, on a bend azure, three crescents *argent*. *

The Napiers of Wrightshouses, (whose antique and beautiful castle, gorgeous with heraldic carvings crowning its numerous doors and windows, was removed in the present century to make way for an hospital,† and whose ancient line of territorial possessors has been severed from its parent stem, and cast aside by modern genealogists,) were a race quite distinct from Merchiston, and obviously an early branch of Kilmahew. Their armorial bearings were, *or*, on a bend *azure*, a crescent between two mollets or spur-rowels,—the arms of Kilmahew with a slight difference. The families of Merchiston and Wrightshouses became closely connected by marriage about the epoch of the battle of Flodden Field, when Margaret, the daughter of Merchiston, married the laird of the neighbouring castle. This appears from the records of the city of Edinburgh, and the carving upon an armorial stone which once adorned a door or window of Wrightshouses, commemorative of that alliance. The stone is still preserved in an artificial ruin at Woodhouselee, and affords additional

* The only ancient seals of Kilmahew probably extant, (the old papers of that family being lost,) I have lately discovered in the Merchiston charter-chest. 1. "Duncan Naper de Kilmahew" is one of the inquest in the retour of Elizabeth Menteith of Lennox and Rusky, spouse of John Napier of Merchiston, dated 4th November 1473. Kilmahew's seal is entire,—it carries a *bend charged with three crescents*. 2. "James Naper of Kilmahew" is one of the inquest in the retour of the brieve of division of the Earldom of Lennox, as to Elizabeth Menteith's share, dated in 1490. This seal has the same bearings.

There are also among the Merchiston papers seals of the Lairds of Wrightshouses. 1. "Alexander Naper de Wrichtyshouse" is one of the inquest in the retour of Archibald Napier, as heir to Elizabeth Menteith, dated 12th December 1488. His seal carries a bend charged with a crescent betwixt two mollets or spur-rowels, and in the sinister chief point what appears to be the head of a unicorn. 2. A deed of reversion, signed and sealed by "Alexander Naper of Wrichtishouse," to Alexander Napier of Merchiston, and Annabella Campbell his spouse. This seal is the same as the former, but without the unicorn's head. There is no date to the deed, but this baron of Merchiston was killed at Pinkie in 1547.

† Gillespie's Hospital, in the neighbourhood of Edinburgh. See Note (A.)

Charter seals proving that the old Earls of Levenax did not carry the cross engrailed. See explanation after table of contents.

proof of the distinction betwixt the two families; the arms of the husband, a crescent on a bend between two spur-rowels, being impaled with those of his wife, a saltier engrailed, cantoned with four roses. The date on the stone is 1513.

While it is impossible, therefore, to follow the peerage-writers who deduce Merchiston from the progenitors of Kilmahew, the armorial bearings of the former, afford at the same time an interesting and remarkable confirmation of so much of the family legend, and prove the antiquity, if not the truth of that pretension.

This proof has hitherto been lost in the inaccurate theory and false assumptions of our great oracles of heraldry, Sir George M'Kenzie and Mr Nisbet, from whom it must be redeemed in order to establish its value.

A transcript of a very ancient charter without a date, describes the Lennox shield as bearing a lion passant.* Such probably was the ensign of those earls until altered in some crusade, of which the cross is an obvious token. M'Farlane of M'Farlane, a most accurate and well-known antiquary of the last century who claimed a lineal male descent from the Earls of Levenax, gives the following traditionary account of their banner:—"Alan M'Arkill, second Earl of Levenax, having accompanied David Earl of Huntingdon, King William the Lion's brother, to the Holy Land, assumed upon his undertaking that expedition, as a badge, a red St Andrew's cross in a white field, which, with the addition of four red roses, became the armorial bearings of his successors."†

Modern writers, almost invariably state these bearings inaccurately. "Sir James Balfour" (says Nisbet) "in his manuscript of the nobility of Scotland, tells us, that Malcolm de Lennox went to the Holy Land, and was crossed, for which he and his posterity carried for arms, *argent*, a saltier engrailed *gules*, cantoned with four roses of the last." ‡

Sir David Lindesay, however, gives the cognizance of "the Erles of Lanox of auld" in its pristine purity, *argent*, a saltier cantoned with four roses *gules*; while for the arms of Merchiston he gives the same, with the ca-

* Register House.

† MSS. Advocates' Library.

‡ Nisbet's Heraldry, v. i. p. 132.

dent difference of the cross *engrailed.* * And who knew better than old Sir David?

Still is thy name in high account,
And still thy verse hath charms;
Sir David Lindesay of the Mount,
Lord Lion king-at-arms.

The most ancient example probably extant of the Lennox saltier *engrailed* is the seal of Alexander Napier attached to the deed of 1453. This date was about the close of the granter's life; and as his son and heir appears to have attained the years of puberty before 1432, we may hold this example of the Lennox bearings, with a mark of difference, to be traced as far back in the family of Merchiston as the end of the fourteenth century.

Assuming a cadency from the earldom, this seal would be scientifically legible. "In carrying arms," says Nisbet, "it has always been punctually observed by all nations, that none shall presume to take to himself the armorial ensign of another, and so intrude into their family and name; for arms are silent names, distinguishing families; and even those of the same blood and parentage could not bear the coat armour of the principal family, without some variety and alteration by which they were distinguished from the stem, and from one another." †

To engrail the cross, though not a definite expression of the particular degree of cadency, as the minute differences of the crescent, the mollet, or the martlet, was yet sufficient to satisfy the code of arms, and such as might be adopted by a cadet, more attentive perhaps to found a new family, than to denote his precise position upon the ancient stem.

* Of this term, *Guillim*, in his Display of Heraldry, gives the following quaint explanation:—"Engrailed is a term derived from the French, graisle or gresle, which signifies any thing struck with hail, which the edges of this band seem to resemble, like the edges of the tender leaf, which is often a sufferer thereby."

"Engrailed is said of crooked lines which have their points outward, as those which form the *saltier engrailed in the arms of Lennox.*" Nisbet's Essay on the Ancient and Modern use of Armories.—Yet in the same work he expressly states, that engrailing was a mode of differencing for cadets. "When lines of partition are carried right by principal families, their cadets make them crooked by putting them under *accidental forms*, such as *engrailed*, *waved*, &c. *for a distinction.*"—P. 115.

† An Essay on Additional Figures and Marks of Cadency, &c. By Alexander Nisbet, gent. Edin. 1702, p. 18.

In like manner, "the M'Farlane," who claimed to represent Gilchrist, a younger son of Alwyne second Earl of Levenax, carried argent a saltier *waved* and cantoned with four roses gules; and it is worthy of remark, that Gilchrist was the name of a brother of him from whom, according to the family legend, the Napiers of Merchiston sprung. If these were brothers, by this variety of differencing their descendants might express their respective cadencies. Nisbet, in his Essay quoted above, has taken these very cadets as examples in support of his proposition, that, "as arms were long in use before surnames, and instead of them served to distinguish descendants, and to show from whom they had their original, so at this day they afford us great advantage, by letting us know from what ancient families a great many of the present families in Europe are descended."—"The *Napiers* and *M'Farlanes*," says he, "cadets of the old family of Lennox; for they both carry a saltier cantoned with roses, but of different tinctures, to distinguish them from one another."

In one respect, however, Nisbet was mistaken in this reference, as he afterwards discovered, for the same mistake does not occur in his large work. Napier and M'Farlane have always been understood to carry argent and gules, the tinctures of Lennox; but for difference, the one *engrailed* the cross, and the other *waved* it. *

Thus it appears that the Napiers of Merchiston, for the very long period during which the proofs are extant, have uniformly carried the Lennox coat, with the cross engrailed for a difference, while no other family of Napier upon record approximate to those bearings. It is impossible to conjecture how this could be, if Merchiston were descended either from Kilmahew or Wrightshouses; or had acquired their pretensions to the Lennox coat through the first-mentioned ancient barons of the Lennox country, who were vassals of that earldom, and yet bore coat armour totally different. It sometimes happened, no doubt, that families, whose ancestors had been feudally dependant upon some great fief, carried on their own shield the armorial bearings of the over-lord, more or less differenced, according to the caprice of those who

* "The M'Farlanes carry the arms of Lennox with this difference, the saltier *waved* instead of *engrailed*,"—(ought to be, *instead of plain.*)—*A System of Heraldry, speculative and practical, with the true art of Blazon. By Alexander Nisbet, gent. First Part.* 1722. *Edin.*

adopted them. " Arms of patronage," says Nisbet in his essay on the use of Armories, " are those of patrons and superiors, carried in part or in whole by their clients and vassals to show their dependance." But when Alexander Napier sealed with those arms early in the fifteenth century, he had no property in the Lennox. His wealth was mercantile, and his property burgage, or at least in the vicinity of Edinburgh; and clearly his family had no territorial dependance on the Lennox whatever. The anomaly, therefore, would be most remarkable, were we to suppose that Merchiston, an alleged branch of Kilmahew, pertinaciously adhered for centuries to the coat of Lennox slightly differenced, as arms of patronage and dependance, after having shaken off all ties to the earldom; while the Napiers of Kilmahew, who remained for so many generations vassals of the Lennox, and always resided on their possessions in that country, never carried a vestige of those arms; an anomaly which would be very much increased by the consideration, that, when Napier of Merchiston married the heiress of the Lennox, he still retained the identical bearings which appear upon the seals of his grandfather and his father:—that is to say, *ex hypothese*, he preferred the arms of patronage of Lennox, though his family had no dependance upon the earldom or possessions in the district, to the proper arms of Lennox, which he might have adopted from his lady, who brought him in right of her own representation, the imposing dowry of one-fourth of those noble domains.

That he had done so is the theory of M'Kenzie and Nisbet. Sir George assumes that this John Napier, rejecting his own whatever they might have been, took the Lennox bearings from his lady, and transmitted the same to his descendants. " Sometimes," says that accomplished lawyer with the utmost gravity, " the husband did of old assume *only* the wife's arms, who was an heretrix; as Scott of Buccleugh the arms of Murdiston, and Napier the arms of Lennox, and did not bear their own native arms."* It happens that both examples fail. " The bold Buccleugh" did not assume " only his wife's arms." The stars and crescent were his own, which originally were carried by Buccleugh without a bend; but with these he afterwards charged the bend of Murdiston as arms of alliance, indicating the marriage with the heiress of that house. Thus Scotland's poet and historian, (a scion who illustrates be-

* Sir G. M'Kenzie's Heraldry, p. 72 and 82.

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Charter seals proving that John Napier 3d of Merchiston did not take the coat of Levenax from his marriage with the heiress of that Earldom. See explanation after table of contents

yond nobility the race of Harden and Buccleugh, as Scotland's philosopher and theologian does the race of Lennox and Merchiston,) tells us :—

" An aged knight, to danger steel'd,
With many a moss-trooper, came on ;
And azure in a golden field,
The *stars and crescent graced his shield*
Without the bend of Murdieston." *

But Sir George has erred even more egregiously in his second example. Napier, so far from assuming his wife's armorial bearings to the exclusion of his own, did exactly the reverse. He retained unaltered the shield of his fathers, without allowing his lady to share it by any mode of armorial matrimony; and it was so retained in its pristine purity for generations thereafter, until it came to be quartered with the royal augmentation of Scot of Thirlstane.

Nisbet has allowed himself to be misled by M'Kenzie. In his essay on the ancient and modern use of armories, he founds a statement upon the faulty passage; and this accounts for the following extraordinary mistake in his great work, the really valuable and delightful institute of Scottish heraldry. " What Napier of Merchiston, the most eminent family of the name, carried of old I know not; but *since* John Napier of Merchiston married Margaret [Elizabeth] Monteith, daughter and co-heir of Murdoch Monteith of Ruskie, and one of the heirs of line to Duncan Earl of Lennox, in the reign of James the Second, they have been in use to carry *only the arms of Lennox*, viz. argent, a saltier engrailed, cantoned with four roses gules." †

It is difficult to understand how Nisbet, an able and enthusiastic herald, came to adopt a theory of arms so unscientific. The proposition is startling, that the eldest son of that Sir Alexander Napier, whose career, we shall find, was most distinguished, had so utterly discarded the shield of a dignified parentage, as to leave no trace of what Napier of Merchiston carried of old. To

* " The family of Harden are descended from a younger son of the laird of Buccleugh, who flourished before the estate of Murdieston was acquired by the marriage of one of those chieftains with the heiress in 1296. Hence the cognizance of the Scotts *upon the field;* whereas those of the Buccleugh are disposed upon a bend dexter, assumed in consequence of that marriage.—See Gladstaine of Whitelawe's MSS. and Scott of Stokoe's pedigree. Newcastle, 1782."—*Scott's Lay of the Last Minstrel, c. 4th, and notes.*

† Vol. i. p. 137.

have done so in those high and palmy days of the Lyon of Scotland, in order to assume only the armorial bearings of his wife, would, however lofty the lady, have been " parma non bene relicta." It is also singular that Nisbet should not have at once perceived, that, had her husband indulged in such caprice, the armorial bearings of Elizabeth Menteith would not by any means have given him the Lennox cognizance *alone*. This lady was eldest co-heiress of the Lennox through Margaret, her paternal grandmother, daughter of the last Earl Duncan. But Elizabeth's own father, of whom she was also eldest co-heiress, was Sir Murdoch Menteith of Rusky, a wealthy and proud baron; being heir-male of Walter Stewart, Earl of Menteith, third son of Walter, high steward of Scotland in the reign of Alexander II., and inheriting a considerable portion of the domains of those earls. Now the house of Rusky, of which Elizabeth is frequently styled *domina* in the family charters, was, as Nisbet himself informs us, " in use to carry quarterly first and fourth, *or* a bend cheque, sable and argent for Monteith, second and third, azure three buckles or;" bearings of which there is not a vestige in those Lennox arms, said to have been adopted from that marriage.

But further, had Napier really assumed those arms, *the cross or saltier would not have been engrailed*; for undoubtedly the co-heiresses of the earldom would carry the shield of the comitatus undifferenced, though combined with their paternal coat.*

It is of some importance in the history of our philosopher's family, that this heraldic evidence should be correctly recorded, the more particularly, as it has been thrown into confusion by such high authorities. Those conversant with the science will know that, in a genealogical point of view, a coat of arms so unequivocally proved as that of Merchiston, by the original charter

* This may be seen in the arms of Haldane of Gleneagles, who married Agnes Menteith, the younger sister of John Napier's lady, and co-heiress with her of Lennox and Rusky. Co-heiresses do not difference their arms, but carry the coat of the house they represent equally. Sir David Lindesay gives both the coat of Haldane of Gleneagles after that marriage, and of Napier of Merchiston. The latter, as already noted, he blazons without any quarterings, being the Lennox shield, with the difference of engrailing. But Gleneagles, according to Sir David, quartered his wife's arms with his own, and there the Lennox cross is, as it ought to be, *plain*. I am aware that, in the official register of arms in the Register-House, the cross in the Gleneagles' coat is *engrailed*; but this is a modern error.—*See Sir David Lindesay's original MS. book of Heraldry in the Advocates' Library*. 1542.

seal of an ancestor born before the year 1400, is not to be disregarded. The language of heraldry, though limited, is distinct; and about the period referred to was cultivated as a science in Scotland, and its rules strictly observed.

But, learned reader, if, like Louis XI., thou shouldst be, "in special a professed contemner of heralds and heraldry,—red, blue, and green, with all their trumpery,—I would pray of you to describe what coat you will, after the celestial fashion, that is, by the planets," * while I proceed to record the worthies who form the paternal chain betwixt this scion of the Levenax, and the great John Napier.

Sir Alexander Napier, eldest son of Alexander the first Napier of Merchiston, succeeded his father in the year 1454. For several years before that event he had become highly distinguished, was about court when a very young man, and probably belonged to the household of the first James, at the time of the murder of that monarch. Undoubtedly he held some post in the royal house not long afterwards, and thus found an opportunity of displaying his loyalty and courage in defence of the persecuted queen dowager.

Urged probably by the forlorn and harassed state of her widowhood, and anxious to obtain a natural protector for the young king, Queen Joanna married the black knight of Lorn, an ally of the house of Douglas. As this marriage indicated a revival of that powerful interest in her favour, a faction of the Livingstons, by which Scotland was then distracted, became bent upon the complete subjection of the royal party. Sir Alexander Livingston was at the time governor of Stirling Castle, in which the queen had fixed her residence with her consort and her son. Upon the second day of August 1439, this faction, with inconceivable audacity, seized the queen's husband and his brother William Stewart, and, without a shadow of accusation, cast them into the dungeons of the castle. According to the mysterious phrase of a contemporary chronicle, they "put tham in pittis and bollit thaim."† Nor did they rest satisfied with this outrage. Admirably fitted for a species of barbarous exercise, which has been termed "riding rough-shod through a palace," Sir Alexander Livingston and his sons, with other accomplices, determined to place the queen herself under restraint; and upon the 3d August 1439 effected their purpose, with an extremity of violence that drew the blood of at least

* Sir Walter Scott.

† MS. Chronicle of the reign of James I. in the family of Boswell of Auchinleck. It is scanty, but valuable, being the sole contemporary record of the reign of James I. and II.

one brave and loyal subject in her defence. This unmanly attack upon the queen has been doubtingly recorded by several historians; but the fact is placed beyond dispute by one of the proudest archives of the family of Merchiston.

Young Napier possessed the gallant spirit and devoted loyalty which has distinguished many of his descendants. He did his best to rescue his royal mistress, and was severely wounded in the attempt. This must have been a daring act, and rare instance of fidelity. Not only was the power of the Livingston faction then irresistible, but true chivalry seemed banished from the land. To borrow the graphic expressions of Pitscottie, these were times "when the whole youth of Scotland began to rage in mischief and lust, for slaughter, theft and murder were then patent; and so continually day by day, that he was esteemed the greatest man of renown and fame, that was the greatest brigand, thief and murderer."

This ill-fated princess whom Alexander Napier in vain endeavoured to rescue, was the Lady Jane Beaufort, a daughter of the Earl of Somerset, of royal descent, and moreover the heroine of "the king's quair," a poem that redeems an age of darkness. She had captivated, by a gentler bondage, its accomplished author, the young King of Scots, when he was pining as a state prisoner in Windsor Tower, and cherishing the most melancholy mood of an ardent and romantic mind. Then it was that, from the lattice of his prison, overlooking a beautiful garden and terrace, "on a fresh Maye's morrow," as the royal poet himself expresses it, "foretired of my thought and woe begone," he saw the Lady Jane,

> "Walking under the tower,
> The fairest and the freshest young flower
> That ever I saw methought before that hour."

Well might the voice of that "tassel-gentle" James I. of Scotland have persuaded a heart more obdurate than the Lady Jane's, that the land of the captive prince was a fairy realm of song and chivalry, where never cruelty could happen to woman. Yet this was the queen, whose most secluded apartments were not secure from the midnight assassin, or from the attack of ruthless traitors!

It is remarkable that Napier, having failed in the rescue, should have escaped the utmost vengeance of the Livingstons. That he did escape with life, though not without grievous injury, and lived to see the day of retribution arrive long after the unhappy daughter of Somerset had found repose in the grave,—is proudly recorded in a royal charter honourable alike to the sovereign and the subject. In the year 1449 when James II. attained ma-

jority, and four years after the death of his mother, the young monarch reared a hecatomb to her memory. The blow which then fell upon the Livingstons is depicted in the Auchinleck manuscript with so quaint an air of authenticity, that we may again quote the words of this unpublished record. "Monunday, the 23d day of September, James of Levingstoun was arrestit be the king, and Robyn Kalendar, capitane of Dunbertane, and Johne of Levingstoun, capitane of the castell of Doune, and David Levingstoun of the Greneyardis, with syndry uthiris. And sone efter this, Schir Alexander Levingstoun was arrestit, and Robyn of Levingstoun of Lithqw, that tyme comptrollar; and James and his brother Alexander, and Robyn of Lithqw war put in the Blacknes, and thair gudis tane within forty days in all places, and put under arrest, and all thair gudis that pertenet to that party. And all officeris that war put in be thaim war clerlie put out of all officis, and all put doun that thai put up. And this was a gret ferlie."

The king, now about to complete his nineteenth year, had been married a few months before the meeting of this Parliament* to Mary of Gueldres. It is more than probable that his young consort had heard from James the eventful history of his boyhood, and that the expressions of her foreboding sympathy powerfully accelerated the fall of those who had persecuted the late queen. Certain it is, that hardly were the tournaments concluded with which James II. honoured his bride, than the scaffold streamed with blood, from which she might gather a better promise of future security, than from the stalwart blows interchanged at their nuptials, between the knights of Scotland and Burgundy. Robert Livingston, comptroller of the royal household, and Alexander Livingston, sons of Sir Alexander, the ringleaders in the attack upon Queen Joanna, were hanged on the Castlehill of Edinburgh in January 1449; while others, more or less guilty, were at the same time cast into prison, or compelled to betake themselves to their baronial strongholds.

But the justice of the young king did not stop here. Immediately after the execution of the two leading traitors, he bestowed the high office of the one, and the possessions of the other, upon Alexander Napier.† Ten years

* It met in September 1449, and commenced with enactments ominous of the approaching fate of the Livingstons and their accomplices. "Gif it happynes ony man till assist in rede, consort, or consal, or mayntenance to thaim that ar justifeit be the king in the present Parliament, or sall happin to be justifeit in tyme cummyn for crimes commitit agaynes the king or *agaynes his derrest modir of gud mynde* sall be punyst in sik lik maner as the principall trispassours."—*Acts of Parl. of Scotland.*

† "Et per solucionem factum *Roberto de Livingstone Compotorum Rotulatori*, ad usus et ex-

had elapsed since the perpetration of the crime; and it is less remarkable that the vengeance of a son slumbered no longer, than that the gratitude even of a youthful king should survive so long. The fact affords an interesting illustration of the disposition of the monarch, no less than of the merit of the deed rewarded. The lands of Philde, part of the lordship of Methven in Perthshire, had belonged to Alexander Livingston; but his forfeiture placed them in the hands of the king. Having already bestowed upon Napier the comptrollership, vacant by the execution of Robert Livingston, James granted him a charter of those lands under his great seal and sign manual. This interesting charter at once records the extreme violence done to the queen-mother, and the noble defence attempted by her faithful domestic; the filial indignation that pursued the traitors, and the kingly munificence that rewarded loyalty. After the lapse of nearly four hundred years it still remains among the archives of his race, from whom the lands of Philde have long since passed away. The great seal of Scotland, attached to the deed, is nearly entire; and the king's autograph yet distinct as on the day it was traced. *

The daring temperament evinced by this act of his youth, seems never to have betrayed Alexander Napier into dangerous paths of ambition; and there is ample evidence that his career, so auspiciously commenced, was ever afterwards distinguished by uncommon talents, prudence and integrity. He had witnessed the fate, and risen upon the ruin of the turbulent Livingstons. Twenty years afterwards he beheld, under a new minority, the similar treason and fate of the house of Boyd. Yet he found himself in possession of the favour and affection of the third sovereign he had obeyed, and still enjoying the respect and confidence of a country vexed and degraded by its brawling barons. In 1451, before the death of his father, he was one of the ambassadors upon whom devolved the difficult and important task of establishing an amicable

pensas domicilii Regis."—*Great Chamberlain Rolls, ad an.* 1448. In the same Roll:—" Scaccarium serenissimi principis," &c. " David Murray de Tullibardine, Alexander Ramsay de Dalwolsy, militibus, *Alexandro Naper, Compotorum Rotulatori*," &c. Napier is also designed *our comptroller* in the Philde charter, dated 7th March 1449. It is obvious, therefore, that he was rewarded with the office of the one traitor, and the lands of the other.

* This was " James with the fiery face." The Philde charter, one of historical value in a reign whose records have been almost entirely lost, will be found in the Appendix, (No. I.) with a fac-simile of the young king's signature before his hand was stained with the blood of Earl Douglas. Another at a maturer period will be found in the note to page 25.

relation with England. The internal dissensions of the neighbouring kingdoms recommended a peaceful policy betwixt them; but it is well known, that the stormy ascendancy of the house of York, and the ungovernable blood of Douglas, rendered that mission one of extreme delicacy and doubtful result. The negotiations however terminated favourably; and a truce was concluded for three years.* A few years afterwards, and subsequent to his father's death, we find him occupying the civic chair of his native city; an honour for many years bestowed upon successive representatives of his family. This office he seems to have held as frequently as his numerous state employments permitted him to exercise its functions. There is evidence still extant of his having been provost of Edinburgh in the years 1455, 1457, and 1469.

Wherever the best interests of his country were to be protected his name will be found. It had been discovered that merchants speculated upon the bullion, which, as the coin exceeded the statutory value, they were tempted to export. A statesman, and probably a merchant, Napier seems to have avoided the vices of both. In 1457, he is one of those "ordaynet and chosen for visiting the moneyes." For many years afterwards this important subject occupied the deliberations of Parliament, and his services are frequently in requisition. By a commission under the privy seal, preserved among the family papers, and dated at Edinburgh the 24th February 1464, "Sir Alexander Napar of Merchamston," and others, are appointed searchers of the port and haven of Leith, in order to prevent the exportation of gold and silver; and in 1473, his name again occurs as a parliamentary commissioner for "searching of the money."

The unfortunate death of James II. did not retard the successful career of Sir Alexander Napier. At the commencement of the new minority, the attendant circumstances of which were almost a repetition of those in the previous reign, he again held the office of comptroller of the royal household.† If

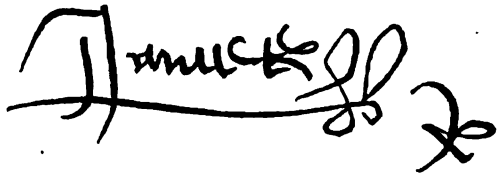
* The indenture is dated 14th August 1451, and signed, T. Episcopus Candidæ Casæ; Andreas Abbas de Melros; Andreas Dominus de Gray; Johannes de Methven, Doctor Decretorum; Alexander Home Miles; Alexander Naper Armiger. All these individuals set out, in the September following, on a pilgrimage to Canterbury, as appears from a safe-conduct granted to them for that purpose by the English government.—*Fœdera.*

† This appears from a discharge among the Merchiston papers, under the privy-seal of James III., bearing, that the king had received "a dilecto milite nostro Alexandro Napare de Mercham-

his talents were not ill appreciated, neither were they spared. His king and country could scarcely have extracted more good service from the intelligence and activity of a single subject. Hurried repeatedly and alternately from the royal household to the civic chair,—from judicial functions to legislative deliberations,—from domestic finance to foreign diplomacy,—his whole life seems to have been a constant round of dignities, embracing occupations of the most opposite and arduous nature. With the Abbot of Melrose and others, he obtained letters of safe-conduct again to pass into England in 1459, as one of the Scottish commissioners appointed to treat in that year. In 1461 he was in still higher consideration. He had obtained the then illustrious honour of knighthood, was appointed vice-admiral of Scotland, and with these accumulated dignities, proceeded as one of the ambassadors to England. *

At this critical period, the rose of Lancaster had been torn and trampled on the bloody field of Towton; and old Holyrood, the sanctuary of royalty in distress, afforded an asylum to the exiled Henry, and his spirited consort Margaret of Anjou. The queen-mother of Scotland bestowed upon them all that the strength of her councils, and the weakness of her kingdom could afford. But the expatriated monarch did more than rely upon Scottish generosity. To aid him in regaining his crown, he tendered to Scotland the castles of the frontier, he promised an English dukedom to the powerful Earl of Angus; and upon the city of Edinburgh he bestowed the prospect at least of very valuable commercial privileges. Amid this lavish policy or gratitude, the family of Merchiston was not overlooked. Henry bestowed a pension of

stoune *nostrorum compotorum rotulatore* bonum fidele et finale compotum," &c. dated at Stirling, 7th July 1461, " et regni nostri primo."



It is interesting to observe the young king's signature to this deed, of which the above is a facsimile. He was anointed and crowned at Kelso on the 24th of August 1460, when a number of knights were made, and probably among the rest Sir Alexander Napier. James was just eight years, two months, and twenty-three days old at his coronation. His signature at a maturer age will be found in the Appendix.

* Fœdera, Tome xi. 476. He is designed " Sir Alexander Napare of Merchainstoun, Vice-admiral of Scotland." The chief admiral was Alexander Duke of Albany, the king's brother.

fifty merks Sterling annually upon John Napier, the son and heir of the vice-admiral of Scotland, who at this time was on his embassy to England.*

Sir Alexander was also in England in 1464, as appears from his letters of safe-conduct dated 6th November of that year; and an important embassy, which occurred in the year 1468, again called into requisition his well-tried sagacity.† Christiern, king of Denmark and Norway, at that time feudal superior of the islands of Orkney and Shetland, had been highly offended at the imprisonment of his friend and favourite Tulloch bishop of Orkney, by the Earl of Orkney. He accordingly sent letters, of no very amicable aspect, to James III., complaining of the indignity. Repeated remonstrances were at length accompanied with an argument more formidable to Scotland than a declaration of war. Denmark demanded the arrears of the Hebudian annual, due to the crown of Norway from those islands; and Scotland found the claim not easy to evade either in law or honour. The menace was met, however, by a courtship of Denmark's daughter on behalf of the young king of Scots; and the latter, instead of paying tribute, eventually received the valuable cession of the islands themselves, in satisfaction of the arrears of the princess's dower.

Lord Napier, in his genealogical account of the family, states that, "in a manuscript book of heraldry, formerly belonging to that great antiquary the laird of M'Farlane, and now in the library of Andrew Plumber of Sunderland-Hall, Sir Alexander Napier is said to have been sent with Andrew Stewart, the lord-chancellor, to negociate the marriage betwixt King James III. and the king of Denmark's daughter." Though I have not discovered any official record of this fact, it can hardly be doubted. Napier, during a period of twenty years, was continually employed in the most difficult and important missions of his day; and the circumstances of the Danish alliance were such as scarcely to dispense with his experience in foreign negociation. Besides, his eldest son was by this time married to a grand-niece and co-heiress of

* See Appendix, (No. II.)

† Betwixt the years 1464 and 1468, Sir Alexander's services were bestowed at home. In 1467 he is one of the commissioners for a tax raised upon the barons, &c. "Item, anent ye taxt of the barouns, it is ordanit yat yar be ane inquisitioun taken be ye personnes efter folowand and depute yarto and nemmyt in ilk schir, and to retour again ye avale of ilk mannis rent, and efter ye cummyn of ye retouris, that ye abbot of Halirudhous, Sir Alexander Napar, and Thomas Oliphant sall modyfie and set ye said taxt evinly apoun all ye persounis yat ar ordanit to contribut yarto."—"Item, it is ordanit yat ye abbot of Halirudhous be resavoir of ye taxt of the clergy, Sir Alexander Napar of ye barons, and Thomas Oliphant of ye baronis."—*Parl. Record.*

Isabella Duchess of Albany and Countess of Lennox, the grandmother of the chancellor. James Stewart, that son of the Duke of Albany who alone escaped by flight from the scaffold where the Duke and his other sons perished, left no legitimate offspring; but the powerful talents of Andrew Stewart, his natural son, raised the latter to that elevation which, under the title of Lord Avandale or Evandale, he so long held in the kingdom. No one had more opportunies of knowing, or could better appreciate the talents of Napier, than the chancellor; and that he was accompanied in this negotiation by his near connection, a man who for so many years had divided his energies betwixt foreign policy and domestic finance, may be assumed upon the authority quoted.* "The negotiations" (says Mr Tytler, in his History of Scotland now in progress of publication) "upon this occasion appear to have been conducted with singular prudence and discretion;" and he adds this lively sketch of the happy result:—"Having brought these matters to a conclusion, in a manner honourable to themselves, and highly beneficial to the country, the Scottish ambassadors, bearing with them their youthful bride—a princess of great beauty and accomplishments—and attended by a brilliant train of Danish nobles, set sail for Scotland, and landed at Leith in the month of July, amidst the rejoicings of an immense assembly of her future subjects. She was now in her sixteenth year; and the youthful monarch, who had not yet completed his eighteenth, received her with that gallantry and ardour which was incident to his age. Soon after her arrival, the marriage ceremony was completed, with much pomp and solemnity, in the Abbey Church of Holyrood; and was succeeded by a variety and splendour in the pageants and entertainments, and a perseverance in the feasting and revelry, which were long afterwards remembered with applause." †

Sir Alexander Napier must have been very wealthy. I have not been able to trace the history of the lands of Philde, or to ascertain their extent; but the comptroller, before the death of his father, took his designation from those lands, which probably were of considerable value. A crown charter, dated

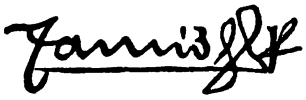
* In the Parliament held 6th May and 2d August 1471, Sir Alexander is designed *Secretary*—"Parliamentum inchoat. apud Edinr. 6th May," &c. "per prelatos, barones, ac commissarios subscriptos;" among others, the Chancellor Avandale, and "Dominum Alexandrum Naper, Secretarium."—*Rotuli Scotiæ.*

† History of Scotland, iv. 221, 222.

24th of May 1452, to "Alexander Napare of Philde," of the lands of Lindoris and Kinloch in the shire of Fife, is yet among the family papers. He succeeded his father in the estate of Nether Merchiston, and the feu-charter of his own acquisition of Over Merchiston from the church of St Giles, is preserved among the archives of Edinburgh. He held of the crown certain lands called the Pulterlands, to which was attached the hereditary office "*Pultrie Regis*," or king's poulterer, the reddendo of which was an annual present of poultry to the king *si petatur tantum*. These lands are described as lying near the village of Dean, in the shire of Linlithgow. Sir Alexander also acquired the lands of Balbartane in Fife, formerly belonging to James Lord Dalkeith. * Besides these extensive estates, it appears from the great chamberlain rolls that he obtained grants of casualties due to the crown; and from the offices he held, his public emoluments could not have been inconsiderable. It is also very probable that he indulged in merchantile speculations. The character and status of a Scottish merchant then ranked high, and was not incompatible with that of a diplomatist and a statesman. Mr Tytler mentions as a remarkable circumstance, that in the reign of James III., "the nobility and even the monarch continued to occupy themselves in private commercial speculations, and were in the habit of freighting vessels, which not only engaged in trade, but falling in with other ships similarly employed, did not scruple to attack and make prize of them." There are no indications of such predatory habits on the part of our philosopher's ancestors; but from the circumstance, that the three first Napiers of Merchiston in lineal male descent were successively provosts of Edinburgh, it may be assumed that these wealthy and distinguished burgesses were

"Merchants and rich burghers of the deep." †

* This appears from a discharge under the sign-manual and privy-seal of James II. to his "lovit and familiar squyre, Alexander Napare of Merchamstoune, of al soumes of mone, &c. ressavit be the saide Alexander Napare of Merchamstoune, the time he was in office til us of comptrollership, or ony uther time to ye date of thir presant letters, and specially of the soume of five hundredth marks, aucht till us be ye saide Alexander for ye charter of the lands of Balbartanis with ye miln liande within the sheriffdome of Fiff, some time belonging to our cousin James, Lord Dalketh," &c. dated at Edinburgh, 24th October, in the 20th year of the reign (1456.)



† "In the Parliament of Scotland, 1466, enactments were passed, "That *na man of craft* use merchandise. Item, it is statuyit and ordanyit that na man of craft use merchandize be him-

The romantic plains of Flanders, with their rich combination of arts and arms, where chivalry and traffic seemed like the lion and the lamb to lie down together, were familiar to Sir Alexander Napier. He was in the town of Bruges, " taking up finance," and making purchases for James III. some time prior to January 1472. This appears from the following receipt, under the hand and seal of the treasurer of Scotland.

" I graunt me to have resavit in oure Soverane Lords name be the handis of ane Richt Honorable and Worshipfull man Sir Alexander Napare of Merchamstoune Knicht the soume of twa hundreth pundis of usuale monee of Scotland of certane finance tane up be the said Sir Alexander in the toune of Bruges, in Flanders, and als that the king has remittit and forgevin him ane hundreth crounes for certane grath * coft and brocht hame to the king be him, of the quhilk soume of [L. 200] I hald me wele content and payt, and thereof in oure saide soverane lords name, quitclames and discharges the saide Sir Alexander of the saide soume of monee and al uther quhame it efferis be this my presente acquitance. To the quhilk I have set my signett, and subscrivit with my awin hand at Edinburgh, the xxvii. day of Januare, the year of God" (1472.)—" Thesaurar J. LAYNG, manu propria."

The *grath* mentioned in this receipt was probably a royal suit of Flemish armour,—in high request in those steel-clad times. The harness and weapons for a man-at-arms in Scotland were frequently selected from the continent, and the records of Parliament in the reign of James II. contain a characteristic statute " Anentis harness to be brought hame be the merchands. Item, it is ordaynit be the king and the Parliament, that all merchands bring hame, as he may gudely thole after the quantitie of his merchandice, harness and harmours, with speirs, staffis, bowyss stringes, and that be done be ilk one of thame als oft as thai happyne to pass our the sey in merchandice."

Bruges, in the fifteenth century, was the focus of all that was wealthy and brilliant.

self, nor saill in merchandise nather be himself, his factouris, nor servandis, *but gif he leyf and renunce his craft*, but colour or dissimulacioun."—" Item, that no man saill nor pass without the realme in merchandise bot *a famous and worshipfull man*." &c.—*Acts of the Parl. of Scotland.*

* Go dress you in your *graith*,
And think weill throw your hie courage;
This day ye sall wyn vassalage,
Than drest he him into his *geir*,
Wantounlie like ane man of weir.

Lyndsay's Squire Meldrum.

The year 1449, that in which James II. avenged the wrongs of his mother, had commenced auspiciously with his marriage to the princess of Gueldres. Some of the negotiations which about twenty years afterwards were intended to renew and strengthen the consequences of this prudential alliance, were committed to the indefatigable sagacity of Sir Alexander Napier. The wounds received in defence of a persecuted queen well became the venerable knight of Philde in his latest embassy to the Court of the Golden Fleece, which occurred in the year 1473.

Sir Alexander was no stranger to Charles the Bold. The tenor of his instructions from James III., as well as his private papers, prove that he had visited Bruges and the court of Burgundy repeatedly before this occasion; * and the last public duty in which he appears to have been engaged was to negotiate, under difficult circumstances, with this gorgeous and overbearing duke. The written instructions which he then received from his sovereign are still preserved in the Merchiston charter-chest, though unknown to history.

While the political relations of England and France, as affected by the ambition of Burgundy, are recorded in the contemporary chronicle of Commines,—picturesque as Burgundian chivalry; and in the modern history of Barante,—exuberant and glowing as romance; our own historical sources afford only imperfect glimpses of the foreign policy of Scotland in those stirring times. Mr Tytler, the latest historian of the period, has done much to elucidate the obscurity; but he confesses the paucity of proofs; and, in some of his deductions, has perhaps misapprehended the real tone of our foreign relations in the last quarter of the fifteenth century. He admits, however, that the instructions to the Scottish ambassadors to England and Burgundy about the year 1470, "were unfortunately not communicated in open Parliament, but discussed secretly among the Lords of the privy-council, owing to which precaution it is

* From a document among the Merchiston papers, it appears that Sir Alexander Napier had lent eighty pounds Scots to William Lord Graham (ancestor of the Duke of Montrose) in the town of Bruges. It appears from the Fœdera, that Lord Graham obtained a safe-conduct to pass into England, and from thence to the continent, 23d December 1466. There were great festivities in Bruges at the nuptials of Charles the Bold of Burgundy in 1468, when the *tournament of the golden tree* was held; and Sir Alexander Napier was probably selecting armour for his sovereign in that romantic town, when it was under all the excitement of the dazzling presence of a chapter of the Toison d'Or.

impossible to discover the nature of the political relations which then subsisted between Scotland and the continent." * The desideratum is, to a certain extent, supplied by these written instructions to Sir Alexander Napier. They furnish new facts filling up chasms in some interesting matters, corroborate our historian in some views of the policy of that obscure reign, and correct him in others. The language and details of this venerable state paper, which is not even to be found in the late splendid edition of the Acts of the Scottish Parliament, are so interesting as to deserve to be literally transcribed. It will be found, therefore, in the appendix. † But the obscurity of the ancient style requires elucidation; and a general view of the historical incidents upon which the instructions cast some additional light, may not be out of place.

The spirit, at least, of Charles "le temeraire," did not disgrace the illustrious memory of his father, or the high blood of England and France that mingled in his veins. Well and quaintly is he described by a writer of his own times, as "Duc de Bourgogne, prince de la maison de France, surnome terrible guerrier, et qui n'a jamais cedé aux grands Roys." ‡ This terrible warrior, whose heart bounded lightly to the bugle of chivalry, till it learnt a strange lesson of terror from the horns of Uri and Unterwalden, and was crushed by

"The might that slumbers in a peasant's arm,"—

then played a desperate game against the crafty Louis XI. which involved the whole of Europe. Connected with England by lineal descent from old John of Gaunt, and closely allied to Scotland through the House of Gueldres, Charles received embassies from all quarters, rendered frequent and anxious by the daring position which he had assumed towards the illustrious crown of which he was but a feudatary. It was the policy of Scotland to reconcile France and Burgundy, her ancient allies. The King of England, than whom, to use the words of James' diplomatic instructions to Sir Alexander Napier, "nane uthir prince made wer upon Scotland," courted Burgundy more earnestly than became his dignity, and even bestowed the hand of his sister Margaret upon the terrible guerrier. It was Edward's object, though scarcely secure at home, to farther his own ambition by fomenting the quarrel, and supporting the war betwixt Charles and Louis. The Duke, on the other hand, in order to relieve England as well as to realize his own unbounded views, laboured to prolong

* Vol. iv. p. 236. † Appendix, (No. III.) ‡ "Discours tire d'un viel Manuscript."

those doubtful pauses of hostility betwixt that country and Scotland, which (again to quote the words of Napier's instructions) were dignified with the names of "pese and trewes," though, it must be confessed, not "sa sicker bundyn."

But Charles found it no easy task to engage James III., however small the pretensions of that monarch to the nom de guerre of his cousin, in a peace even of limited duration with England. It appears that the king of Scots was far from evincing that disinclination to hostilities with the sister kingdom which Mr Tytler infers from the muniments he had examined. Our historian conceives that "the repeated consultations, between the commissioners of the two countries on the subject of those infractions of the existing truce which were confined to the borders, evinced an anxiety upon the part of both to remain on a friendly footing with each other." But the instructions seem rather to contradict this view. It is there expressly stated, that James had absolutely refused to ratify a treaty with his cousin of Burgundy, to which his own ambassadors had agreed; because he thought the terms too favourable to England. It may be true that James and his ministers had full "occupation at home," but it is by no means proved that the former "wisely shunned all subjects of altercation which might lead to war."* On the contrary, having despatched ambassadors to Burgundy for the purpose of renewing the offensive and defensive alliance entered into betwixt their respective fathers, the king of Scots proved not very tractable on the subject of peace with England. He had introduced some exception in favour of his father-in-law, the king of Denmark. Charles, on his part, proposed an exception in favour of the king of England, and had sent his own ambassadors to James urging him to prolong a truce with that country for the space of two years, as a personal favour and support to Burgundy. The Scottish ambassadors in Flanders consented to the exeption proposed by the Duke of Burgundy; but James refused to ratify what he considered a reckless or negligent concession on the part of his ambassadors. He immediately furnished Sir Alexander Napier with these special and confidential instructions, deprecating in strong terms the exception in favour of the only king who made war upon him,—an important item in a treaty of mutual defence,—and he was too much in earnest to stand upon ceremony with regard to the king of Denmark, but at once departed from his own condition in favour of that monarch. With these original exceptions left out, James sent letters under his great seal to the Duke, comprehending "baith the auld confederatioun and the new" in all other points;

* Tytler, iv. 239.

and " requerand his said cousing the Duc, that gif the forme of the said new confederatioun send to him be acceptable, that he will ressave it, and deliver siclike under his gret sele to the said Sir Alexander." Further, the king of Scots complains bitterly of injuries and indignities from England, committed upon his lieges both by sea and land, and still remaining unredressed, though, says James, Edward had pledged his royal word, and bound himself in writing to make immediate reparation. He declares that nothing less than his own affection and respect for his cousin of Burgundy could have induced him to listen to the Duke's urgent request of a truce with England, and he requires Charles, as an indispensable condition of the stability of any such truce, to send ambassadors of the highest credit to England, to demand compensation from Edward for the Scottish grievances; and in particular, " to mak him redress incontinent the bargh broken at Balmburgh." Instead of shunning all subjects of altercation with England, King James, *inter alia*, harped incessantly upon this same Bishop's barge for years until he got amends.* Aggressions from the states of Burgundy, of more consequence to Scotland than the pillage of the blessed ship St Salvator, are also complained of in Napier's instructions. The severe treatment experienced by our merchants in the Hans towns opposed serious impediments to commerce. Animosities growing out of the thievish propensities of certain Scottish merchants, led to reprisals from the states of Flanders. After a long course of mercantile hostilities, the Bremeners captured a vessel and cargo of considerable value belonging to the town of Edinburgh. This severe indignity to our commercial flag occasioned an embassy to the Low Countries, headed by the provost of Edinburgh, conveying anxious proposals for a treaty of redress and mutual concessions. An adjustment was then effected which sprung from the wise and able administration of Bishop Kennedy; but it appears from Napier's instructions, that a good feeling betwixt the mercantile interests of the two countries was not re-established even in 1473, thirty years subsequent to the bishop's mission. James, after his indignant and spirited expressions against the king of England, ventures in a minor key, to remind the dangerous duke, (" his derrest cousing and confederat,") of the ancient commercial ties betwixt

* See *Pitscottie* for the building of the " Bishop's barge" by Archbishop Kennedy; and *Lesly* for its wreck and spoliation. Rymer (xi. 850,) records an acquittance by Thomas Bishop of Aberdeen, dated 3d Feb. 1474–5, for 500 marks English, " pro finali concordia, &c. super *querelis unius navis vocati le Salvator quæ fracta juxta Bamburgh.*"

them; and complains, *sotto voce* however, that his merchants are aggrieved as to their privileges in the town of Bruges, "and nocht sa wele tretit be thame as frendis suld be, na as thai are tretit in Scotland quhen thai cum." *

Another very anxious object of Sir Alexander Napier's mission was "the matter of Gelrill." This item of the instructions regards a wild and sad story in the history of the dutchy of Gueldres; a romance in which Charles the Bold is a prominent actor, and James III. a spectator deeply interested. †

For a long period of the fifteenth century, that unhappy dutchy presented the revolting spectacle of a son leagued in deadly enmity against his father. The eldest daughter of the reigning Duke Arnold was that princess whom Philip of Burgundy conducted with great pomp into Scotland as the bride of James II., and who became the mother of James III. The consort of the Duke of Gueldres was Catherine of Cleves, an undutiful wife and mother, who instilled lessons of disobedience and revolt into the mind of their son and heir, the young Adolphus, which the latter too aptly acquired. In consequence chiefly of the conduct of this princess, disorders of long endurance arose in the dutchy. An unnatural war, in which Arnold was opposed by his consort and son, terminated favourably for the old Duke. Adolphus fled to the court of Burgundy, where he was more kindly entertained by his uncle Philip than his own conduct had merited. He afterwards became a follower of the cross, and a knight of the high and holy order of St John of Jerusalem. But the chivalry of Christendom failed to reclaim the heart of Adolphus. He returned from the Holy Land to Burgundy, where his uncle again received him with the highest distinction,—bestowed upon this unworthy prince the hand of Catherine of Bourbon, (Philip's niece) and invested him with the collar of the Toison d'or. It was the object of the benevolent Duke of Burgundy to reunite the unhappy house of Gueldres; and through his exertions, the festivities of this alliance were distinguished by an apparent reconciliation of Catherine to her husband, and Adolphus to his father. It appears that the old Duke of Gueldres, notwithstanding all his wrongs, still dearly loved his

* "Come youngster, you are of a country I have a regard for, having traded in Scotland in my time. An honest poor set of folks they are."—*Louis XI. to Quentin Durward.*

† "Well, my young hot blood," replied Maitre Pierre, "if you hold the *Sanglier* too scrupulous, wherefore not follow the young Duke of Gueldres?"—"Follow the foul fiend as soon," said Quentin. "Hark in your ear; he is a burthen too heavy for earth to carry. Hell gapes for him. Men say that he keeps his own father imprisoned, and that he has even struck him. Can you believe it?"—*Quentin Durward.*

son, and the occasion was to him the happiest of his life. With a heart relieved from a load of sorrow and anxiety, he retired early from the ball to repose. But Adolphus and his mother had plotted a cruel conspiracy. A party of rebels who espoused their cause, made a desperate midnight attack upon the chamber of the Duke, who supposing the disturbance to be a bridal frolic, exclaimed, with a bonhommie worthy of a better fate, "Let me sleep, my children, I am too old to dance." When he heard the fierce reply, "You are a prisoner," his unsubdued affection burst forth in the exclamation, "Is my son safe?" and even when, at the head of the conspirators, that son replied, "Yield! you have no alternative!" the old Duke uttered but a single remonstrance,—"Alas! Adolphus, what make you there?" He was dragged nearly naked to the castle of Burin, where he long languished in a dungeon, only visited by the light of day through a miserable aperture, sometimes darkened by the shadow of the remorseless Adolphus, * who came there to load his aged parent with execrations. Not long after the death of Philip the Good, Charles his successor, forced Adolphus to release the Duke of Gueldres.

Upon this page of history, Sir Alexander Napier's instructions afford a new commentary. They account more naturally than historians have been able to do, for that apparently desperate and sudden inclination to go a-roving, which for a time possessed James III. They also prove that Charles of Burgundy actually extorted the succession of Gueldres from the oppressed and aged Duke. When released by the determined though selfish interference of Burgundy, the sole remaining anxiety of Duke Arnold was to exheridate his only son, who had embittered his declining years, and had so recklessly crushed the last spark of parental affection. But Arnold had no partiality for Charles the Bold; nor did he entertain an idea that the haughty Duke of Burgundy should become his successor. He looked to Scotland, where his eldest daughter,—at one time his presumptive heiress,—had borne three sons, who seemed to do more credit to the house of Gueldres than his degenerate Adolphus. Failing that prince, his natural inheritor was James of Scotland; and the fond hope of the old man was to persuade the monarch to come in person to the dutchy, and be formally installed in the succession forfeited by the treason of the young Duke. If James could not quit his dominions, Arnold looked for the presence of one or other of his remaining grandsons,—the Duke of Albany and the Earl of Mar,—whose knightly bearings and ardent tempera-

* This horrid scene attracted the pencil of Rembrandt.

ments fitted them much better than the king for such an enterprise. It appears from Napier's instructions that these wishes had been expressed in a letter from the Duke of Gueldres to his royal grandson, which, so far as I can discover, is unknown to history. Mr Tytler imputes the unusually restless impulse of James to the warlike persuasions of Concressault, the French envoy, who urged in the name of Louis XI. the conquest of Brittany. But James was not easily beguiled into such extravagant manhood; and why he so readily agreed to yoke the red dragons, and take the reins himself, contrary to the earnest and almost ludicrous remonstrances of Parliament, is a problem in the effeminate character of that monarch. The letter from his grandsire of Gueldres, "exorting and requiring" him to pass into the dutchy as his natural inheritance, for the purpose of being unanimously installed by the nobles and barons of that rich principality, must have had a more powerful effect upon the dispositions of James III. than the warlike voice or wily promise of "Mesnil Penil."* The alternative proposed by his grandfather, namely, to send Albany or Mar as a substitute, and which proposal was likely to be more eagerly received by his brothers than suited the views of King James, must have added to his inclination to go in person; and the idea that the letter in question was at least his chief instigation, is strengthened by the fact, that shortly after the sudden death of the old Duke of Gueldres, James abandoned his enterprise altogether. Mr Tytler, however, refers the king's final determination to another cause. "On the 17th March 1472," (says that historian,) "the birth of a prince, afterwards James IV. had been welcomed with great enthusiasm by the people; and the king, to whom, in the present discontented and troubled state of the aristocracy, the event must have been especially grateful, was happily induced to listen to the advice of his clergy, and to renounce for the present all intentions of a personal expedition to the continent."† Duke Arnold died upon the 24th of February, in the year 1472,‡ that is to say, towards

* So Barante terms the Sieur Concressault, perhaps for *Monipenny?* Pinkerton, (i. 294,) speaking of Albany's reception in Paris, 1479 says, "Louis ordered Monipenny and Concressault, Scotishmen of rank, to attend the Duke;" but were Monipenny and Concressault two persons? "Monipenny de Congirsalte" was an individual well known in the reigns of James II. and III.

† History, iv. p. 241.

‡ *L'art de verifier les dates.*—Pinkerton is wrong in his chronolgy of Duke Arnold's death. He says "Arnold of Egmont became Duke of Guelder in 1423, and died in 1468. His son having rebelled against him, he left his territories to Charles the Bold, Duke of Burgundy."—*History of Scotland*, V. i. p. 206.

the close of the year which, according to the Scottish kalendar of that period, ended upon the 24th day of March. There is no date attached to the instructions themselves, but they bear internal evidence of having been written immediately after Arnold's death; and another document which accompanies them among Sir Alexander's papers, fixes their date immediately after the 1st of May 1473. The document alluded to is a letter of protection from James III. under his privy-seal, for the lands, servants, and goods, of his beloved familiar Sir Alexander Napare of Merchamstoun, knight, ordered forthwith beyond seas on his majesty's service; and from all pleas, &c. from the day of his departure to the day of his return, and forty days thereafter, dated at Edinburgh the 1st day of May 1473.*

The conduct of the King is thus very naturally accounted for. His grandsire's invitation was a powerful inducement; but on receiving intelligence of that prince's death, James found it convenient to pause before coming into contact with his cousin of Burgundy, whose affectation of retributive justice in keeping the young Duke Adolphus under personal restraint, very slightly veiled the most interested designs. The power and ambition of Charles was notorious; and James, having lost the countenance of his father-in-law, must have felt how hopeless would be a descent upon the proffered dutchy, unless beaconed by the imperious star of Burgundy. Under this new aspect of affairs, and while his prelates and lords of Parliament were still uncertain of his resolves, and devising new expostulations to prevent his quitting the kingdom, the King of Scots instructs Sir Alexander Napier to urge the Duke of Burgundy to send "in haistywiss his entent thereapon," to afford the king counsel and directions in the matter, "and quhat that he sal traist and lippin thereto, sen he [Burgundy] has the personage in hand that pretends to have richt or interess thereto."

In vain had the Duke of Gueldres struggled to place a grandson on his throne; the power of Charles the Bold was at its zenith, and his very conscience was clothed in steel. On the 30th December 1472, Arnold had been compelled finally to conclude at Bruges a cession of his territory in favour of

* "Jacobus," &c. "sciatis nos dilectum famuliarem nostrum Alexandrum Napare de Merchamstoun militem, quem *ad partes transmarinas nostris in negotiis derigimus de presenti*," *&c.* "datum sub nostro secreto sigillo apud Edinburgh primo die mensis Maii A. D. millesimo quadringentesimo septuagesimo tertio, et regni nostri decimo tertio." At the very time, John Haldane of Gleneagles was sent ambassador to Denmark, probably on the same subject.

Burgundy, reserving to himself a liferent possession, which, however, burdened the grant only two months. The earnest request transmitted in writing to his grandson about the period, leaves no doubt that this will (so called) was extorted. Perhaps, in that cession the aged and heart-broken sovereign signed his own death-warrant; the times and the actors were not uncongenial for such deeds, and a surmise as dark shrouds the fate of a prince of Bourbon in a more enlightened age.

The next object of the Duke of Burgundy was the disposal of that "personage" whose "richt or interess in the matter of Gelrill" might interfere with the equivocal will of the old duke. If the concluding words of James' instructions meant to convey no hint favourable to the wretched Adolphus, Charles, who in such matters required little prompting, anticipated so far at least the views of his ally. At the very moment when Napier was about to leave Scotland, the "terrible guerrier" was dealing with the disobedient son according to his deserts,—but neither for the sake of justice nor of King James.

Adolphus was a knight-templar and a knight of the golden fleece; and Charles was determined that the imposing solemnity of his fall should dazzle the eyes of Europe, and veil the selfish motives of his judge. He cited him before a chapter of his order assembled at Valenciennes on the 3d day of May 1473; and Sir Alexander Napier may have once more beheld the Court of Burgundy glowing with chivalry. No picture of arms could equal a chapter of the Toison d'Or; and the princes who flocked to its imperative summons must have rendered the place of its enactment an imposing scene. Upon these occasions Burgundy displayed his most gorgeous array. He replenished his order with the most illustrious names in Europe; and now it was a sovereign prince whom he summoned to defend his honour before the assembled chapter. But the young Duke of Gueldres, though cited, was not permitted to quit his prison. He was only allowed to appear by a procurator, and as might be expected, the knights of the golden fleece in one voice sustained the will of the late duke, and pronounced a decree of perpetual imprisonment against his son. So ended the hopes of King James in that quarter, his truant disposition, and the last diplomacy in which Sir Alexander Napier received instructions from his sovereign. I may have erred in this application of the document to illustrate the history of those remote times, and have given it in the Appendix, that the reader may judge for himself. It is a very interesting fragment of

history, clothed in the quaint terms of our ancient language upwards of three hundred years ago; and now,

> When the knights are dust,
> And their good swords are rust,
> And their souls are with the saints, we trust,

casts a light like the dubious gleam of a corslet, upon times illuminated by few or no records.

Sir Alexander died soon after, and while he was master of the household to James III. On the 15th February 1473, being the close of the same year at the commencement of which the Knight of Philde's last mission occurred, John Napier of Rusky was infeft in the lands "vulgariter nuncupat. le pultre land," as nearest lawful heir of the late Sir Alexander Napier, his father.

I have quoted below the last grant he received under the hand and seal of his royal master, as it forms an apt conclusion to a career which must have been eminently distinguished by talent and virtue in a barbarous age.*

* "James, be the grace of God, King of Scottis, to all and sundry oure liegis and subditis, quham it efferis, quhais knaulage thir oure letters sal cum, greting.—Forsamekill as oure lovett famuliare knicht and maister of housshald, Alexander Napar of Merchamstoun, has componit with us on the behalve of Johnne Napare his sone and are, and Elizabeth his spouss, for the soume of twa hundir markis, and fifty markis of usuale money of oure realme, for the composition of the parte of the Erldome of Levenax, pertenyng to the saide Johnne be ressoun of his saide spouss, in a part heritare of the said Erldome. The quhilk soume of twa hundir and fifty markis we have in favour of the saide Alexander, *for his lele and trew service done of lang tyme to us and our progenitouris of mast noble mynde*, remittit and forgevin, and be thir oure lettres remittis and forgevis to the saide Johnne and Elizabeth his spouss, and quit clemys, and dischargis thame, thare airis, executouris and assignais thareof, for us and oure successouris for euermare, be thir presentis gevin undir oure prive sele, and subscrivit with oure hand at Edinburgh, the xxiiij day of October the yere of our Lorde a thousand, four hundreth, seventy and thre yeris, and of our Regnne the xiiij zeir."

He married Elizabeth, a daughter of the ancient Scottish family of Lauder, of which marriage there were at least three children.* As an additional evidence in support of his own aristocratic pretensions, it may be mentioned that, while his eldest son John Napier married the co-heiress of Lennox and Rusky, his only daughter Janet formed an alliance yet more illustrious. She married Sir James Edmonstone of Edmonstone. The mother of her husband's father was the Princess Isabella, daughter of Robert II. Sir William Edmonstone, her husband's uncle, (being the younger brother of his father,) again allied his family to the royal house. He married the Princess Mary, eldest daughter of Robert III., his own first cousin. Thus the grandchildren of Sir Alexander Napier were the great-great-grandchildren of Robert II. and one generation nearer in the collateral line to Robert III., which monarch was also the father-in-law of their paternal uncle.

John Napier of Rusky, and third of Merchiston, belonged to the royal household during the zenith of his father's active career,† and stood high in the estimation of his countrymen. It has been already observed, that he was particularly noticed by Henry VI. when that unfortunate monarch was a refugee in Edinburgh; and, from the situations he held, there can be no doubt that this John Napier inherited some portion of his father's talent, and was

* See Note (A.)

† In a charter of the lands of "Calzemuk," from the Queen dowager of James II., dated 16th July 1462, to John and his *second* son George, the former is designed "dilecto familiari scutifero nostro Johanni Napare de Rusky." Mary's seal is attached;—the lion of Scotland and the lions of Guelders parted per pale.

The following curious document under the privy seal of James III., also designs John as being of the household:—

"Rex,—Weilbelouite clerk we grete you wele, and for sa mekil as it is menit and complenzete to us be our *louite familiar sqwiar* Johne Napar of Merchamestoune, that quhar he has optenit apon the Lady Cragmillar a siluer basing and ane ewar in his areschip befor the Lordis of our counsale, scho schapis to procede agains him befor you in the spirituale courte, and has summounde him befor you, and tendis to get a sentence thereupoun; of the quhilk we ferly. We exhort ande prais you herefor, & alsa chargis straitly & commandis, that the said action is prophane & is decidit & finaly endit befor the said Lordis, lyke as thar deliverance & decrete gevin to the said Johne thereupon purportis, ye desist ande cess of al proceding therein as ye will haue thank of us, and under al pain & charge that efter may folow, deluering thir our lettres, be yow sene and understandin, again to the berar. Gevin under our signet at Edinburgh, the xv day of June, and of our Regne the xiiij yere [1474].

not unworthy of his lineal representative of the same name. He is repeatedly mentioned, during a period of many years, commencing before the death of Sir Alexander, as one of those chosen, " ad causas et querelas audiendas in parliamentis,"—a committee of Parliament, which necessarily comprehended a selection of the leading and talented men of the country. His name also frequently occurs in the " acta dominorum concilii," as one of the Lords of Council, to whom, before the establishment of a Court of Session, the supreme jurisdiction of the country was intrusted. In these important legislative and judicial functions, he seems to have supplied his father's place when that statesman was abroad on the public service, and also after his death. In like manner, he was at various times provost of Edinburgh. It is a notable instance of the high estimation in which the lairds of Merchiston were held, that three of them, in immediate lineal succession, repeatedly held that responsible office during a period of half a century; and in times which, though turbulent and unlettered, are regarded as having been highly auspicious to the growing consideration and improvement of the city of Edinburgh. The period embraced by the dates of these successive provostships in the Merchiston family is said to have been palmy days for old Edina, who then commenced that mighty march of improvements, which has progressed from the Cowgate to the Acropolis, outstripping the admiration of the world, and the patience of her taxed inhabitants.

In a Parliament held at Edinburgh on the 16th February 1483, when Napier sat as one of the lords auditors, a case occurs in which he is the party. It seems sufficiently curious and characteristic of the times to be quoted from its unpublished record. On one of the sederunts of that Parliament, (20th February,) " The Lordis Auditoris decretis and deliveris, that John Courrour sall content and pay to Johne Naper, provost of Edinburgh, a croce of gold wayand ane unce, price L. 6, with five sapphiris, price twenty shillings, a grete perle, price forty shillings, and thre uther small perle, price of the peice three shillings; because there was a day, assignit of befor to the said John Currour, to have brought his warrand anent the said croce, and failzeit therein the said day; and that letters be direct to distrenze him therefor." *

There is every reason to believe, that during the fickle turbulence which characterized the unhappy reign of James III. he had never swerved from his

* Acta Auditorum.

allegiance, and that he lost his life under the standard of that monarch, upon the disastrous day of the battle of Sauchieburn. A new and shameful rallying point had been seized by the factious towards the close of the year 1487. The young prince of Scotland, James Duke of Rothsay, had not completed his fifteenth year; and the standard of rebellion and patricide was unfurled over the head of a boy. The unnatural struggle, which commenced on the 2d February 1487, was short though violent, and the result is well known. Upon the 11th June 1488, the insurgents defeated the king's forces at Sauchie, near the memorable field of Bannockburn; and James himself was basely murdered on his flight from the lost battle. In a charter of that monarch, dated less than a twelvemonth before the battle, John Napier is designed our beloved household esquire; and, by the expressions in the retour of his son and heir, the period of his death may be traced to the very day of the battle;* an interesting circumstance, as two of his lineal heirs-male fell successively at Flodden and Pinkie. His marriage to Elizabeth Menteith involves the history of the right to the earldom of Lennox, a subject fully discussed in the Lennox case for Merchiston at the end of the volume.

His eldest son, Archibald Napier of Edinbellie, and fourth of Merchiston, belonged to the household of James IV. at the commencement of that reign.† Of his career I have discovered few particulars, except that he married thrice, connecting himself each time with noble and distinguished families, Douglas, Crichton, and Glenorchy; as more fully recorded in the genealogical note. There is a charter in the record of the great seal, 22d February 1494-5, by which James IV. confirms a charter of mortification, dated 9th November 1493, for support of a perpetual chaplain (unius capellani perpetui) at the altar of St Salvator within St Giles' Church of Edinburgh; granted by Archibald Naper of Merchamstoun, with consent of Elizabeth Menteith, Lady of Rusky, his mother; to pray for the souls of the Kings James I. II. III. and IV. and of the deceased Sir Alexander Naper of Merchamstoun, Knight, grandfather of the mortifier; and of his grandmother Elizabeth Lauder, Sir Alexander's spouse; of his father and mother, John Naper of Merchamstoun and the said Elizabeth Menteith; and also for the souls of him-

* See Note (A.)

† Letters under the privy-seal of James IV. in favour of "our lovit familiar squiar, Archibald Napar of Merchameston;" dated 7th February 1488.

self and his wife Catherine Douglas. The sum mortified was ten merks yearly.

Betwixt his second and third marriage occurred the battle of Flodden. Led by a barbarous love of arms, and a wild romantic spirit of chivalry, James IV., in the year 1513, determined to invade England. The voices of wisdom and superstition were blended to warn the infatuated monarch. But he was not to be stayed; and his folly sealed the fate of Scotland. It is well known that the devoted barons and gentry of the Lothians followed their sovereign *en masse*, and were conspicuous in the very centre of the battle. The Earl of Bothwell led these chiefs and their retainers, who were placed immediately in the rear of the king's division. After the four earls commanding the Scottish wings (Lennox, Argyle, Crawfurd, and Montrose,) were slain, the men of Lothian found themselves placed betwixt the victorious bands of Surrey and Stanley, where they fought and bled in vain.

Still from the sire the son shall hear
Of the stern strife and carnage drear
Of Flodden's fatal field,
Where shiver'd was fair Scotland's spear
And broken was her shield!

Archibald Napier escaped the carnage of that fatal day, and survived beyond the year 1521. But his eldest son was left dead on the field.

Sir Alexander (fifth of Merchiston) who fell at Flodden, was the only son of Archibald's first marriage with Catherine Douglas; (a daughter of the illustrious house of Morton and Whittingham,) and had obtained the honour of knighthood some years before his death. James IV. by a charter dated 21st June 1512, erected the lands of Merchiston and others into a free barony in his favour, with all the consequent privileges, thus forming a second barony in the family. He married Janet, the eldest daughter of Edmund Chisholme of Cromlix, the same family from which his great-grandson, the philosopher, took his second wife.

Their eldest son, Alexander sixth of Merchiston, was, upon the 11th of March 1513, infeft in the barony of Edinbelly-Napier, as heir to his father. The young laird was at this time an infant, having been born about the year 1509. He was the only son; and junior to both his sisters, Helen and Janet, the first of whom became the wife of Sir John Melville of Raith, and the other of Andrew Bruce of Powfoulis.

When he was only about sixteen years of age, a conspiracy was entered into by some of his relations both against his purse and person, which may be noticed, as it introduces names of historical and romantic interest, and is moreover characteristic of the times. His mother, after the loss of her first husband, married Sir Ninian Seton of Touch and Tullibody, a baron of a well known and ancient house, who became the guardian of young Merchiston. His maternal uncle was James Chisholme, (chaplain to James III.) who had been at Rome in 1486, and was at that time provided by Pope Innocent VIII. with the bishoprick of Dumblane. This prelate also took some charge of his nephew. Upon the 18th day of June 1525, a contract was concluded at Edinburgh, of which the parties were, on the one side, the Bishop of Dumblane, the Lady Seton his sister, her husband Sir Ninian for his interest, and the young laird of Merchiston; and on the other side, Archibald Douglas of Kilspindie, Isabella Hopper his wife, and Agnes Murray, the daughter of Isabella by a previous marriage. This contract bears, that, in contemplation of a marriage to be solemnized, and hereby contracted between Alexander Napier and Agnes Murray, the former was to grant a receipt and discharge to Douglas, Isabella Hopper, and Agnes Murray, as if he had obtained from them the sum of 1200 merks as a marriage portion. That this sum was to be held in trust by the parties contracting, as a marriage portion for Janet Napier, the sister-german of Merchiston, whom failing, to his other sisters. Then follows a clause by which the young laird bound himself to grant to his mother and stepfather a full and free discharge of all intromissions whatever with his means and estate, up to the date of the fulfilment of the marriage betwixt him and Agnes Murray. There is no indication among the family papers that this marriage actually took place; and upon the 23d September 1531, after he had become of age, Alexander Napier executed a deed of revocation, narrating this contract, and declaring that he had only become a party to it in consequence of the ***sinister machinations***, and ***false information*** of his own relations. He therefore revoked the whole transaction as done to his great prejudice.* The Douglas mentioned in this deed was the celebrated Sir Archibald Douglas of Kilspindie,† son of Archibald fifth Earl of Angus, (the great Earl, commonly called "Bell

* "In sua minorietate, ex sinistra machinatione circumuentus per certos suos consanguineos, fatebatur se recipisse." &c.—*Merchiston Papers.*

† "Archibald of Kilspindie, whom he [James V.] when he was a child loved singularly well for his ability of body, and was wont to call him his Gray-Steill," [a champion of popular romance.] —*Godscroft.*

the Cat") by his second wife, Catherine, daughter of Sir William Stirling of Keir. He was appointed high treasurer of Scotland, 29th October 1526, by James V., who was trained to manly exercises under his faithful care, which he ill-requited. Hume of Godscroft, (the historian of the house of Douglas, who wrote in the reign of James VI.) gives an affecting account of Kilspindie's services and fate; and Sir Walter Scott has immortalized him in the Lady of the Lake.

Two years after the date of this revocation, Alexander Napier obtained a dispensation from the Pope for his marriage with his cousin Anabella Campbell, which deed, dated 9th October 1533, is still preserved among the family papers. It was the interest of the Church of Rome to throw as many obstacles as possible in the way of matrimony, in order to have the credit and the profit of removing them; and this dispensation proceeds upon the narrative, that the parties were related to each other within the fourth degree of consanguinity. As the deed afforded no other clue to the family of Anabella Campbell, the late Lord Napier, in the progress of compiling the genealogy of his house, applied to the Earl of Breadalbane for information on the subject, and received the communication which will be found below. *

Soon after his marriage Merchiston went abroad, and was much in foreign countries, latterly, it would appear, on account of his delicate state of health. The

* "*London, July* 11, 1803.

"My Dear Lord,—I have endeavoured to collect every information I possibly could on the point you wished; the result is from a memorandum I took when I was at Taymouth, after attentively examining Jamieson's genealogical tree, as well as a book (manuscript) containing a history and some anecdotes of the family of Glenorchy. It is as follows:—

"'Sir Duncan Campbell of Glenorchy, who succeeded his father Sir Colin, in the year 1480, and was afterwards killed at the battle of Flowden in 1513, was, by his second wife, ——— Moncrieff daughter of the Laird of Moncrieff, father to John Bishop of the Isles, and to Catherine and *Anabella Campbell.* Catherine was married to the Laird of Tullybardine; and Anabella to Napier of Merchiston, (the dates of these daughters' marriages are not mentioned,) from whom was descended, Sir Archibald Napier, John Napier, and Archibald Lord Napier of Merchiston.'

"I assure you it gives me great pleasure to find there is such an alliance between your Lordship's family and mine; and I have the honour to be, my dear Lord, your obedient humble Servant,—Breadalbane."

This genealogical information is confirmed by the following document, which Lord Napier had not observed among his papers.—"10*th November* 1554, *&c.*—The quhilk day ane honorabill man Archibald Naper of Merchamstoun [the philosopher's father] past to the personalie presence of ane honorabill lady and his *traist consignate* Kathryne Campbell Lady Tulyberdin, executrice and intromissatrice with the gudis and geyr of vmquhile ane honorabill lady, Dame Margaret Moncreif Lady Kers, and proponit, that becaus it wes cumin to his vnderstanding that the said

royal licenses to travel, and charges to return, which he received under the privy-seal and sign-manual of James V., are still preserved among the family papers. Upon the 18th and 28th September 1534, he obtained royal letters of license and protection, bearing that, " We, for the guid, trew and thankfull seruice done to us be our louit, Alexander Naper of Marchamston, and Androw Bruss of Powfoulis, his guid bruthir," &c. " grantis and gevis licence to thaim to pas to the partes off France," &c. for three years. The letters protecting his property in his absence narrate, that " our weilbelouit Alexander Napar of Merchamstoun is of our speciall licence to pass furth of our realm be sey or be land, for fulfilling of his pilgramage at Sanct Johne of Ameis in Fraunce," &c.

At this time France was the centre of attraction; and James V. not long afterwards went there himself on his matrimonial expedition. " Here is to be remembred," says Bishop Lesley, " that thair wes mony new, ingynis and devysis, alsweil of bigging of paleicis, abilyementis, as of banquating and of menis behaviour, first begun and used in Scotland at this tyme, eftir the fassione quhilk thay had sene in France. Albeit it semit to be varray comlie and beautifull, yit it wes moir superfluous and volupteous nor the substaunce of the realme of Scotland mycht beir furth or susteine; nottheles, the same fassionis and custome of coistlie abilyements indifferentlie used be all estatis, excessive banquating and sic lik, remains yit to thir dayis, to the greit hinder and povartie of the hole realme."

Napier did not return with the royal cortege, but had been ordered home immediately afterwards, as appears by another letter dated at Edinburgh the 28th July 1537, and under the hand of the monarch, prolonging his leave of

vmquhile Lady Kers had namit him ane of hir executouris, protestit for the oter prices and availl of quhatsumeuir gudis or geyr that the said Lady Tulyberdin intromettis with, disponis or puttis away of the said vmquhile Lady Kers's, and for remeid. Super quibus dict. Archibaldus cepit instrumenta in manibus mei notarij subscript. Acta in domo Johannis Forester de Logy, infra burgum de Strivling," &c. " The samin day comperit befor me noter and witnes vnderwrittin, Maister Neyll Oyg, leiche, and Dene Dauid Nicholl, channoun in Cambuskynet, and confessit of thair awne motive, will, &c. that thai wer in the Lady Kers chalmer on Friday the secund day of Nouember instant, scho beand apon hir deid bed, and wes requyrit be Schir Johne Craig curat of Strivling, to mak her testament, scho ansuerit on this manner: I have na geyr to mak testament of attour ye valour of xl libs. except ye Lard of Merchamstonis, and his bruthir and sisteris geyr. Super quibus Honorabilis Archibaldus Naper de Merchamstoun cepit instrumenta," &c. " The nowmer of ky pertening to the Lady Kers.—Item of newcauld ky xij ky. Item of ky to ye bule xv ky. Ane bule of twa zeir auld, ane stot of the samin eild, thre qwy calfis, and thre stot calfis."

absence. " Forsamekle as we for divers causis and considerationis moving us, directed oure writingis to command and charge Alexander Naper of Merchamstoun, now being in the partis of France, to returne hame in this oure realme with all diligence, as in oure writingis directed thereuppoun is at mair lenth contenit, and now we ar surelie informit that the said Alexander is vesiit be the hand of God, and fallin in the feberis, quharfor he may not travale for to cum hame in this realme for danger of his liff, we be the tennour heirof dispensis with the said Alexander to remane still in the partis of France quhar he now is, quhill he haif recouerit his heill, and have new charge of us for his returning hame in this realme, notwithstanding our utheris letters directed of befor to charge him to cum hame." But the absence of a single baron on whose loyalty and counsel he could rely, seems at this time to have been considered an important circumstance by James, and indeed, from the state to which the country had been reduced by the paralyzing defeat at Flodden, a baron could ill be spared. The following pressing letter was accordingly despatched by the king to recall Merchiston from France.

" To oure weilbelouit freynd the Lard of Marchaymstoun.

" Traist frend we grete zou weill. Forsamekill as oure Perliament is continewit to the ferd day of November nixt to cum, and all our Baronis ar ordanit to compere in the samyn, for treting and concluding upoun grete materis concerning the weill and honour of us, oure realme and lieges, and it is oure will nochtwithstanding ony oure licence grantit to zou of before, all excusatioun postponit, that ze in speciall compere in oure said Perliament the said day, for zour avyss and counsale to be had tharein. Oure will is herefor, and we pray zou effectuislie, and als chargis, that incontinent efter the sycht hereof, all excusatioun cessing as said is, ze cum hame within this oure realme, and compere in oure said Perliament the said day and place personalie, to the effect forsaid, as ze will ansuere to us at zour uter charge. Subscrivit with oure hand and under oure signete, at Edinburgh, the first day of August, and of oure regnne the xxv yeir."—[1538.]

The above is folded and directed in the form of a letter and sealed with the royal signet.

The active career of James V. was now drawing to its melancholy close. In the year 1542 his barons deserted his standard at Fala; and refused, with one solitary exception it is said, to follow their ardent monarch across the border to invade England. So great was the disgust which he had occasioned to the chiefs of his army, that loyalty and love of arms was in abeyance with them all except Sir John Scott of Thirlestane, who possessed the estates of Thirlestane, Gamescleugh, &c. lying upon the rivers Ettrick, and including St Mary's Loch at the head of Yarrow. This baron, amid the general disaffection, nobly declared, that he with his plump of spears would follow the king wherever he led; and one of the latest acts of James V. was to reward his feudal devotion by a charter of those arms, which are now quartered with the Lennox roses of Merchiston.

From fair St Mary's silver wave,
From dreary Gamescleugh's dusky height,
His ready lances Thirlestane brave
Array'd beneath a banner bright.
The tressured fleur-de-luce he claims
To wreath his shield, since royal James,
Encamp'd by Fala's mossy wave,
The proud distinction grateful gave,
For faith 'mid feudal jars;
What time, save Thirlestane alone,
Of Scotland's stubborn barons none
Would march to Southern wars;
And hence, in fair remembrance worn,
Yon sheaf of spears his crest has borne;
Hence his high motto shines reveal'd
"Ready, aye Ready," for the field.*

The disgraceful rout of Solway, which immediately followed, sealed the fate of the unhappy king; and the heart which had withstood the rude assaults of affliction from the death of his first consort, and of the two young princes whom his second had lately borne him,—which had been impervious to the voice of justice and mercy when he decreed the death of the Lady Glammis,—broke under the affliction of dishonour to his arms.

* *The Lay of the Last Minstrel.* The heir of line of Merchiston is lineal heir-male of Thirlestane; Lord Napier being also Sir William Scott of Thirlestane, Bart. and possessor of that estate.

Alexander Napier could not have been disloyal.* It seems that he had never recovered the fever by which he was attacked abroad; and that in the second year of the new reign he again settled his worldly affairs, and obtained leave from the regent to go abroad for a twelvemonth. The letters run in the queen's name in these terms:—"REGINA.—We, with aviss and consent of oure derrest cousing and tutour, James Erle of Arrane Lord Hamiltoun, protectour and gouernoure of oure realme, understanding that oure louit Alexander Naper of Merchamstoun is vexit with infirmiteis and seikness, of the quhilkis he may nocht be *gudelie curit and mendit within oure realme.* Thairfore, and for certane utheris caussis and considerationis moving us and oure said gouernour, be the tennoure heirof grantis and gevis licence to the said Alexander to pas to the partis of France, or ony utheris beyond sey quhar he pleiss, and thar remane for curing of him of his saidis seikness for the space of five zeris nixt to cum eftir the day of the dait heirof, and will and grantis that he sall nocht be callit nor accusit thairfore, nor incur ony skaith or danger thairthrow in his persone, landis or gudis, in ony wiss," &c. "Gevin under oure signet, and subscriuit be oure said governoure, at Edinburgh the xxviii day of Merche, and of oure regnne the secund zeir." (Added in different ink before the signature.) "This licence my lord governoure intendis to haif effect for *ane zeir alanerly*, and farder induring his Gracis plesure." (Signed) "JAMES G."

But it was Napier's fate neither to die abroad, nor of the sickness which seems so long to have afflicted him. He departed to be cured by the cunning leeches of a foreign land; and he returned to lose his life in one of those memorable battles which form such melancholy chapters in the history of Scotland. He fell at the battle of Pinkie in September 1547, when the Earl of Somerset inflicted another defeat upon the chivalry of our country. The circumstance

* Alexander Napier had certainly returned to Scotland after the king's letter. Among the family papers is a summons raised by him to effect redemption of a dwelling-house which his grandfather Archibald had sold under that conditional clause, to "Andro Bishop of Murray." The details of what was then considered a great mansion are curious. "All and hale his [Napier's] grete mansion, contenand hall, kecheing, loft abone the kecheing, pantre, and loft thairabone, than occupit be maister Jasper Cranstoun, the chapell and three sellaris, with ane litill hous callit the presone, and all thair pertinentis, liand within oure burgh of Edinburgh, on the north side of the street of the samyn." The summons is dated 16th October, first year of the reign of "Marie, be ye grace of God Quene of Scottis," *i. e.* in 1543, when she was precisely ten months old; and is directed against "Patrick, now bishop of Murray, and maister Henrie Lawdre our advocat."

of Alexander Napier falling in this battle is mentioned in the confirmation of his will by Anabella Campbell his widow. *

Among the Merchiston papers there is an interesting charter, alluding to the death in battle of the two Alexander Napiers, in relation to the following circumstances: Mathew Stewart, fourth Earl of Lennox of the usurping line, became after the death of James V. the rival candidate with the Earl of Bothwell for the affections of the queen dowager. But having warmly embraced the project of an alliance betwixt the young Queen of Scots and Prince Edward of England, and taken arms in support of the English interest, he was compelled on the failure of that matrimonial scheme, to fly to England. He signed a secret convention with Harry VIII. in June 1544; and in August following was sent into Scotland with a hostile fleet and army. For this and other treasonable delinquencies, he was forfeited in Parliament 1545. The Napiers of Merchiston, as we shall have occasion more particularly to notice, held of the Earls of Lennox the lands of Blairnavaidis and Isle of Inchmone in Lochlomond, with valuable pertinents and privileges, as a compensation, by way of *excambion*, for higher interests in the fief usurped by those Earls. As the earldom of Lennox fell into the hands of the crown by this temporary forfeiture, the vassals required to have their respective grants renewed or confirmed to them by the sovereign. It would appear that Haldane of Gleneagles, taking advantage of the confusion of the times and the minority of Archibald Napier, obtained a grant of the lands of Blairnavaidis &c. to the exclusion of the Merchiston family. In the year 1558, however, before the Earl of Lennox was restored, and shortly after the marriage of Queen Mary to the Dauphin, that princess issued a charter, revoking the one she had granted to Gleneagles, and reinstating the family of Merchiston in their patrimonial rights. The precept of sasine under the great seal of Queen Mary is dated 14th July 1558, and narrates, that the lands of Blairnavaidis, eister and wester, with the Isle of Inchmone, and the right of fishing over the whole of the lake of Lochlowmond, (in lacu de Lochlowmonde,) &c. which belonged to Archibald Naper, holding of Mathew late Earl of Lennox, and which have fallen into our hands by reason of escheat and process of forfeiture against the said Mathew, &c. and which, after the decree of forfeiture we, in our minority, had granted by charter under our great seal to James Haldane of Gleneagles, his heirs and assignees,—

* See the series of family wills in the Appendix, No. IV.

and which lands and islands having again fallen into our hands by reason of our general revocation made in our last Parliament,—and we considering that the predecessors of the said Archibald Naper had obtained the said lands in *excambion* from the predecessors of the said Mathew late Earl of Levenax,—so that they may have regress to their first excambion, and also because the said Archibald and his predecessors were in no manner of way participators in the crimes of the said Mathew late Earl of Levenax, but were innocent of the same; * and that they in all past times have faithfully obeyed the authority of our realm, even to death, and have, under the standard of our dearest grandfather, and under our own, in the battles of Flowdoun and Pinkie, been slain; —therefore, and for other good causes moving us, we, after our general revocation in Parliament, have of new given and granted to the said Archibald Naper of Merchanstoun, his heirs and assignees, the said lands of Blairnavaiddis, eister and wester, isle, fishing," &c.

Archibald Napier, seventh of Merchiston, to whom this charter was granted, was the eldest son of Alexander killed at Pinkie, and Anabella Campbell. At the time of his father's death, Archibald had not completed his fifteenth year. On the 8th November 1548, he obtained a royal dispensation enabling him, though a minor, to feudalize his right to his paternal barony, in contemplation, it would seem, of his marriage to Janet Bothwell, the mother of our philosopher, which occurred in or before the year 1549. † The connection was highly eligible, though from his extreme youth it might have involved some imprudent step. John Napier, however, had no reason to blush for his maternal descent.

Archibald Napier's father had an intimate friend in Francis Bothwell, one

* The words are "ac nos considerantes predecessores dicti Archibaldi Naper predictas terras in excambium de predecessoribus dicti Mathei olim Comitis de Levenax habuerunt, sic, quod regressum ad eorum primum excambium haberent; et quod dictus Archibaldus et sui predecessores nullo modo seu pacto participes cum iniquitate dicti Mathei olim comitis de Levenax fuerunt, sed innocentes de eadem erant, et quod ipsi omnibus temporibus retroactis authoritati regni nostri fideliter servierunt, *usque ad eorum decessum*, et quod *sub vexillo quondam charissimi avi nostri* et *nostro vexillo in bellis de Flowdoun et Pinke occisi fuerunt*; idcirco," &c.

† His retour runs in the name of the young Queen of Scots and bears, "quod est legittime etatis *per dispensationem nostrum* cum consensu et assensu nostri charissimi consanguinei Jacobi comitis Aranie Domini Hamiltoun nostri tutoris et gubernatoris," &c.

of the most respected and distinguished burgesses of Edinburgh in the reign of James V. In one of Alexander Napier's testaments, he names Francis Bothwell sole tutor of his eldest son, failing the administration of his widow Anabella Campbell. Bothwell, however, died before the battle of Pinkie; and the tutorial charge of young Merchiston devolved upon his uncle Sir William Murray of Tullibardine, James M'Gill of Rankeillor-nether, and John Forrester of Logie.

At the tender age of fifteen, or thereabouts, this interesting minor was united to Janet Bothwell, the daughter of his father's friend, and of Katherine Bellenden, only daughter of Patrick Bellenden and Mariota Douglas, and sister of the distinguished Thomas Bellenden of Auchinoul, Justice-Clerk and Director of the Chancery to James V. A notice of the Bothwell family in Nisbet's Heraldry records, that Francis Bothwell "married Janet, one of the two daughters and co-heirs of Patrick Richardson of Meldrumsheugh, and got with her these lands lying within the regality of Broughton, and shire of Edinburgh. He had by his wife two sons and one daughter: Richard, who was provost of Edinburgh, and allied in marriage with the house of Hatton; Mr Adam Bothwell, the second son; and Janet, who was married to Sir Archibald Napier of Merchiston, mother by line to the honourable and learned mathematician, John Napier of Merchiston, inventor of the logarithms." In tracing this family, however, through the old records of the city of Edinburgh, I detect a fact not observed by any genealogical writer, that the mother of this celebrated prelate Adam Bothwell Bishop of Orkney, and the grandmother of our philosopher, was not the heiress of Meldrumsheugh, as hitherto supposed, but Katherine Bellenden of Auchinoul.* No record could more fully

* One of the ancient protocol books bears an entry to this effect, that William Bothwell, burgess of Edinburgh, acting as bailie for James Mailville, son and heir of the late James Mailville, burgess of Kirkaldy, lord of Dunsyre in the barony of Bothwell, and shire of Lanark, gives seisin at the east town of Dunsyre to the attorney of Adam Bothwell Bishop of Orkney, proceeding on a precept of clare constat, which narrates, that "clare constat et est notum quod quond. Magister Franciscus Bothwill, burgensis burgi de Edinburgh, et Katherina Ballinden, ejus sponsa, *pater* et *mater* reverendi in Christi Patris Adami Bothwill, miseratione divina episcopi Orchadensis, latoris presentium; obierunt ultimo vestiti et sasiti ut de feodo in conjuncta infeodatione de omnibus et singulis terris ville orientalis de Dunsyre, &c. et quod dict. reverendus pater *est legitimus* et *propinquior hæres* eorundem quond. Magistri Francisci Bothwill et Katherine Ballinden, sue sponse, inter eos legitime procreatus." Subscribed at Edinburgh, 27th August 1560.—Protocol book marked *Alexander King, 4th Vol.*

or distinctly establish a genealogical fact than what is quoted in the note; but as the same records prove that Francis Bothwell had been previously married to Janet Richardson, the question remained, whether the Bishop of Orkney was John Napier's maternal uncle by the full or the half-blood. A remnant of the ancient Books of Adjournal of the High Court of Justiciary, preserved among the MSS. of the Advocates' Library, solves this question also. In a trial of the magistrates of Edinburgh, of date 22d March 1566, for setting a prisoner at liberty who had committed "slauchter;" Sir Archibald Napier, the philosopher's father, is one of the prosecutors, while Sir John Bellenden officiates as justice-clerk, having also a seat on the bench. An objection is taken for the pannels by Mr David Borthwick, who "allegit that the justice-clerk mycht nocht be clerk in this mater, nor voit thairintill, becaus he and the lard of Merchamestonis wyfe wes sister and brethir bairnis, and that thair wes bairnis betuix the said lard and his spous." This proves that Katherine, the only sister of Sir Thomas Bellenden of Auchinoul, was the grandmother of John Napier; for that lady unquestionably was the aunt of Sir John Bellenden, who succeeded his father, Sir Thomas, as justice-clerk. It can be proved, however, from various sources, that this Katherine Bellenden was the wife of the famous Oliver Sinclair, whose ill-fated elevation in the affections of James V. led to the untimely death of that monarch. But the difficulty is removed by an expression in a letter (to be afterwards quoted) of the Bishop of Orkney to Archibald Napier in 1560, wherein he mentions "Olyfer Sinclair, my gud-father." Thus, by a very accidental chain of conclusive evidence, the maternal descent of John Napier is, for the first time, completely cleared.*

Our philosopher's mother must have been reared in the family of this unfortunate minion of James V. It is also worthy of remark, that by other near relatives of Merchiston, the same monarch was attended and soothed at the moment the news reached him of the defeat of his favourite at Solway. Helen Napier, eldest daughter of Sir Alexander killed at Flodden, had married Sir John Melville of Raith, who was particularly distinguished in the reign of James V., and one of the early Protestant martyrs of the Reformation in Scotland.†

* See Note (B) as to the Bothwells and Bellendens.

† He was beheaded by the Catholic faction in 1548, although the most honourable and innocent statesman of his country. An old MS. history thus records the death of "Johnne Meluill, ane nobill man of Fyff, quho was ane of the king's most familiaris, quhois lettres send & writtin to ane certane Englisman, recommending vnto him ane freind of his takin pressoner, war inter-

Their daughter Janet, thus the cousin-german of our philosopher's father, became the wife of Sir James Kirkaldy of Grange, high treasurer of Scotland. Towards this lady and her son William, so remarkably celebrated as the champion at once of the Reformation and of Queen Mary, James V. entertained the same affectionate regard with which he honoured the treasurer; and the most friendly intercourse seems to have passed betwixt the monarch and these cousins of Merchiston. It was to their residence in Fife that he first betook himself, accompanied by young William Kirkaldy, upon hearing of the rout of Solway. Grange was from home; but his lady received her sovereign (conducted by her son) as became one in whose veins flowed the united loyal blood of Melville of Raith, and Napier of Merchiston; and who was, besides, the spouse of his best and most faithful councillor. She exerted herself to calm his ruffled spirits, and to persuade him to take nourishment. During supper, she endeavoured to sooth and comfort him by every means in her power. "It is the will of God," said the good lady, "take not his will amiss."—"My portion," was his reply, "of this world is short. I will not be with you fifteen days." His servants tried to rouse him with the idea of festivities. "Where shall we prepare for the approaching Christmas," said they; to which the king answered, with a smile of derision, "Choose your place; but this I know, before Christmas arrive you will be masterless, and the realm without a king." Shortly after, he went to his own palace of Falkland, where he lay down to die. Those around endeavoured once more to rouse him with the intelligence, that his queen was safely delivered of a fair daughter. "A daughter," said the dying monarch, and turned his face to the wall, "the devil go with it; it will end as it begun; it came from a woman, and it will end with a woman."* After that, continues John Knox, who probably had all the particulars from his intimate friend William Kirkaldy, he spake not many words that were sensible, but ever harped on his old song, "Fy fled Oliver? Is Oliver taken? All is lost."

Thus prominent, in one of the most interesting scenes of the history of the Stuarts, were the near relatives of Archibald Napier and Janet Bothwell, a few

ceptid. Althocht thair was no suspitioun of any crime conteaned in thame, zit was the wrytid lettre and wryter thairof harlid to judgement. His landis geivin to David Hamilton, the gouernouris younger sone, maid the punischement moir filthie. The arme of theise infamous deidis twitchid bot a few, the invy many, bot the example perteneit almost to all."—*Johnston's MS. Hist. of Scotland, Adv. Library. See Pitcairn's Trials.*

* Knox's History of the Reformation.

years before their youthful union, which was crowned by the birth of our philosopher.

Francis Bothwell, the father of John Napier's mother, is a worthier object of historical reminiscences than her stepfather. For many years he presided over the councils of his native town, and aided those of the state, both legislative and judicial, with an honest energy of character and talents that had fallen on evil times. At the period of the battle of Flodden, when the magistrates and citizens of Edinburgh distinguished themselves both by their devotion in the field, and by the wisdom and firmness with which they met and provided for the exigencies of a moment so fatal to the independence of Scotland, Bothwell ranked foremost among his fellow-citizens. In the course of the period betwixt the years 1514 and 1524, he passed successively through all the dignified civic offices during the unpopular regency of Albany.

One curious feature in the history of the manners and the times is displayed in the fact that, while the country was torn with war and scourged with fearful visitations of pestilence, and while at a moment's warning the very gutters of Edinburgh were apt to run red with the best blood of Scotland, the citizens of the highest class lent themselves to promote a species of saturnalia or unruly games, which not unfrequently added to the savage turbulence of the times. Yet some of the graver and wiser citizens expressed a distaste for these dangerous gambols, refused their countenance to the play, and declined the elevation pressed upon them of being masters of the revels. Such recusants, however, were only regarded as traitors to Momus, and an extraordinary power seems to have been exercised by the town-council over any member of the community who attempted to evade the crown and sceptre of misrule. He was liable to heavy fines, which were rigorously exacted, even to the extent of attaching his property. Francis Bothwell accepted the dignities of bailie, " magister societatis," dean of guild and provost of Edinburgh ;—but that of " Litil John," to which in 1518 he was elected, being not agreeable to his habits and tastes, he declined to accept, and was actually constrained to petition the Earl of Arran, at that time provost of Edinburgh, for a remission from the duty imposed upon him, and from the consequences of his non-acceptance. It must have been a sight truly ludicrous to behold some dignified and thoughtful bailie, such as the grandfather of our philosopher, his heart full of disgust and foreboding, making sport to the rabble, and kicking his heels perforce,

under some fantastic dress, amid the merriment of his more jovial brethren and the shouts of the assembled populace. The old record of Bothwell's escape from figuring in this tyrannical mummery, affords so curious an illustration of the customs and manners of the day, that I shall give it here in the quaint terms of the original:* "17 April 1518, the 12th hour.—The quhilk in presence of the president, baillies, counsall and communitie, Maister Frances Boithwell producit my Lord Erle of Aranis principall provest's writingis and charge, till *excuse him fra the office of litil Johne* to the quhilk he was chosen for this yeir, desyrand the samyn to be obeyit and the tenour thairof to be incertit in this instrument, the quhilk tenour of the said writing followis: "President, ballies and counsall of Edinburgh we greit you weill; It is understand to us that Maister Francis Boithwell your nichtbour, is chosin to be litil Johne *for to mak sportis and joscositeis in the toune*, the quhilk is a man to be usit in *hiear and gravar* materis, and als is apon his viage to pas beyond sey his neidfull erandis; quharfor we request and prayis, and als chargis you that ye hald him excusit at this tyme, and we be this our wrytingis remittis to him the law, gif ony he has incurrit for none excepping of the said office, discharging you of ony poynding of him tharfor. Subscrivit with our hand at Linlithgow the 12th day of Aprile, the yeir of God 1518. Youris, JAMES ERLE OF ARANE. The quhilk wrytingis the said Maister Frances allegit war nocht fulfillit nor obeyit, and tharfor he protestit that quhat euir war done

* Protocol Book of the City of Edinburgh.

In the "Register of the proceedings of the Burrow Court and Court of Consale of Haidinton," embracing the period betwixt 28th June 1530, and last day of April 1555, the following entries occur, which show that this custom was in full vigour more than twenty years after Francis Bothwell's appointment in Edinburgh. 1540, March 30.—"The which day the bailies and community ordain, that whoever be made abbot this year, that he shall take the same on him within 24 hours next after they be chosen and charged therewith: or then to refuse the same, and pay their 40 shillings ilk ane after other *as they refuse;* and this to be observed in time to come. The which day, James Horne was chosen by the bailies and community Abbot of Unreason for this year; and failing of him, Patrick Douglace, flesher; and failing of him John Douglace, mason; syne Philip Gipson; syne Robert Litstar; syne James Raburn; syne John Douglace, baxter; and George Vaik. July 20.—The bailies and assize will, that the first burgess that beis made, except burgess-air, be given to Patrick Douglace [that is, the fees paid when a person was admitted burgess,] for his Abbot of Unreason, that he should have; and will relieve the town of the bond that they are bound to him therefore."

These May games occasioned so many tumults, that the Legislature was at length compelled to put them down by acts of Parliament, which it was very difficult to enforce.

in the contrar turn him to na prejudice, and for remeid of law, tyme and place quhar it efferis."

After this, Francis Bothwell became provost of Edinburgh, and continued to rise still higher in public estimation, and in the employment of his sovereign James V. He appears in the rolls of Parliament, 16th November 1524, as a commissioner of the burghs, and was then chosen one of the Lords of the Articles; again on the 10th July 1525, and on many other occasions. On the 7th June 1535, he appears as one of the royal commissioners to Parliament, and also one of the commissioners for the city of Edinburgh. He was again chosen on the Articles, and appointed by the barons one of the commissioners for the tax granted to James V. on his marriage.* But not the least of his honours was having been selected as one of *the fifteen* upon the institution of the College of Justice. The Court was for the first time assembled in presence of his majesty on the 27th May 1532, and their sittings have continued ever since at the appointed times, except when occasionally interrupted by war, pestilence, or usurpation. Francis Bothwell was among the number of "cunning and wise men" chosen for the temporal side; while on the spiritual, the person who had the honour of being named first after the Lord Chancellor and president, was Richard Bothwell, his younger brother.

From every line of his descent talent seems to have flowed in upon John Napier. His granduncle Richard being bred to the church, was made prebend of the Cathedral of Glasgow, and afterwards appointed rector of Eskirk or Ashkirk, a parish in the presbytery and shire of Selkirk, and diocese of Glasgow. He was director of chancery to James V. not long before another granduncle of our philosopher's, Sir Thomas Bellenden, held that office in the same reign.† He appears as one of the royal commissioners for fencing or opening Parlia-

* Act Parl. II. 285, 339, 340, 343. Historical Account of the Senators of the College of Justice, by Messrs Brunton and Haig.

† Pinkerton says (ii. 356,) "The transactions of this year (1540) commence with a negotiation on the borders, in which it was mutually agreed that all fugitives, from either realm, should in future be surrendered to their respective sovereigns. Sir William Eure appeared for Henry, and Mr Thomas Ballenden and Mr Henry Balnavis for the Scottish king. This affair, of little moment in itself, is connected with an important letter from Eure to the lord privy-seal of England, in which he narrates some conversations with Ballenden, *a man of aged experience and eminent abilities*, concerning the court and character of James, on which they reflect a new and strong light." This was Sir Thomas Bellenden, our philosopher's grand-uncle. Thus both his grand-uncles, of separate stocks, were successively directors of the chancery to James V., and very able men.

ment in August and December 1534, was chosen one of the Lords of the Articles for the clergy on the 7th June following, and on the 12th of that month was appointed, by his brethren of "the spiritualitie," one of their commissioners for the taxation granted by the three estates to the king on his marriage. He was also doctor of the civil and canon laws, and provost of the church of St Mary in the Fields, which became so infamously unhallowed by the name of Kirk-of-Field, as the place of Darnley's murder. A curious testimonial of the rector's worth and services will be found below. * He was frequently at his post after the date of that dispensation, and died in the year 1547.

Francis Bothwell died about twelve years sooner,† leaving a family who sustained to the full, the reputation of their father's talent. Richard, his eldest son, (of the marriage with Janet Richardson,) succeeded him as provost of Edinburgh; Adam, the son of Katherine Bellenden, rose to a mitre, and ran a most extraordinary and conspicuous career in church and state; Janet, the bishop's full sister, was the mother of the INVENTOR OF LOGARITHMS.

* "REX.—Chancelar, President, and Lords of our Sessioune, we greit yow weill. Forsamekle as we understand that our lovit servitour and counsulir, Maister Rechert Bothuell, is greitlie trublit be infirmate and seiknes, swa that he is noclit so abile to continew our service, and to remane with you continewelly as he was wont, herefor we movit of gude consideracioune, and rememberand his aulde and guid service dune to uss, and to our derrest fader, quhome Gode assolye, relaxis him, and grantis to him our gudewill, leif and licence to kepe himself frae labouris and inquietacioune, quhill God sende him his perfyte heil and strength, because we knaw that he is of gude mynde thane to continew, and to do us service as he wes wont to do before, we grant him that he sall brouke, for all the dayis of his life, all sic honoures, dignities, privilegis, and exempcionis, with all utilitie and proffittis that our haly faider the Paip and we hes granted to thame that daily sittis on our seit. Gevin under our signet and subscripcionne manuall, at Edinburgh the 24th day of Februare, and of our regnne the 27th yeir.—JAMES."—See *Act of Sederunt*, 1811, 39.

† In a manuscript volume, entitled Anderson's Protocols, preserved in the Advocates' Library, I find a notice of probably the last illness of our philosopher's maternal grandfather; the oath and evidence (in support of an instrument to which he had been a witness, in the year 1527,) "honorabilis viri magistri Francisci Bothuile ciuis Edinburgensis, *gravem egritudinem* patientis," was taken in his house in Edinburgh, 20th December 1535.

CHAPTER II.

THE last chapter affords the only accurate account hitherto recorded of the lineage, paternal and maternal, of the illustrious Napier. In this chapter we must glance at the state of Scotland, and the near relatives among whom he was reared, from the period of his birth to the commencement of his public education.

He was born in the year 1550, at Merchiston, the seat of his forefathers, near Edinburgh; four years after the birth of Tycho, fourteen before Galileo, and twenty-one before Kepler. But the youngest of these contemporaries reached the summit of fame at an earlier period than he did. They encouraged and emulated each other in their brilliant careers. He was distant and isolated from the great arena of letters; cooped up within the narrow limits of desolate Scotland, and encircled with savage sights and sounds of civil discord, above which the name of God was howled by those whose hands were red with murder. When we regard his times, and observe the influence that for so long a period of his life, the war of religion exercised over his intellectual exertions, the wonder is, not that his great contemporaries of the continent became distinguished before him, but that after all he should have extricated his mind from so many toils, and have placed himself by a single effort—though one like the spring of a roused lion—at the side of the astonished demi-gods of science, who had been unconscious of their rival.

In the year of his birth commenced, properly speaking, the Reformation in Scotland. In that immediately preceding it, John Knox was released from the French galleys, to which his participation in the defence of the castle of St Andrews, after the murder of Cardinal Beaton, had consigned him; and

was then enjoying royal patronage in England. A very few years afterwards, however, the accession of the "bloody Mary" to the throne of England, and of the Catholic Mary of Guise to the regency of Scotland, depressed the Protestants in both countries, and Knox was again driven into exile. But many of the lesser barons, and a few of the higher nobility in Scotland, had embraced the new doctrines with irresistible ardour. These were the men who soon called forth the genius of the *elève* of Calvin into that prominent and popular action for which its rugged features were so eminently fitted; and their movements and policy it was that induced him to quit Geneva for Scotland in the year 1555, when he met with the most flattering reception. A pressing call from his flock at Geneva occasioned his return before the close of that year, particularly as his friends in Scotland, though anxious to retain him, were as yet unequal to afford him the necessary protection. To use his own words, he "passed to the Earl of Argyle, who then was in the Castle Campbell, where he taught certain days. The laird of Glenurchy, which yet liveth, being one of his auditors, willed the said Earl of Argyle to retain him still, but he, resolved on his journey, would not at that time stay for any request; adding, that if God blessed those small beginnings, and if that they continued in godliness, whensoever they pleased to command him they shall find him obedient." *

The patrons of Knox here mentioned were the relatives of Merchiston, whose domestic history I resume at that momentous year of the Reformation (1559) when the Protestant apostle returned to Scotland, and commenced in his own country the part allotted him in the great revolution by which Europe was agitated. At this time Archibald Napier was residing in the castle of Merchiston with his family, consisting of his wife Janet Bothwell, his two sons, John (in his ninth year) and Francis, and one daughter, Janet. Our philosopher's father possessed talents of the highest order, which he sustained through a long life with unblemished integrity. A deep and speculative turn of mind, which eminently characterized his race, seems to have withdrawn him from that rude and tumultuous militancy, by which many barons, like his cousins Tullybardin and William Kirkaldy of Grange, were distinguished in the Protestant revolution. He had studied the laws, one of the fashionable pursuits of times upon whose turbulence the dawn of letters was breaking. There

* Knox's History.

is some authority for saying that he was a proficient in the mathematics;* and his practical abilities for science and more ordinary matters will appear in the sequel. This character sufficiently accounts for the fact, that although, in the progress of a long and active life, Archibald Napier rose to high consideration in the state, he is not identified with any one of those stormy and desperate events which have rendered the names of many of his near relatives and family connexions familiar to history. Of some of these relatives we may here take a cursory glance.

At the head of the "Congregation of the Lord" was Archibald fifth Earl of Argyle. His father was the first man of his rank who openly espoused the reformed faith in Scotland. The fifth Earl was still Lord Lorn, and about twenty-three years of age, when, in 1555, Knox went to Castle Campbell before his departure to Geneva. When Lorn succeeded to the earldom in 1558, though attached to the new doctrines, he had not as yet separated from the party and councils of the queen-regent. In this year he was appointed to carry the crown and other insignia of royalty to the Dauphin. The person named to accompany him on that illustrious mission was James Stewart, prior of St Andrews, Mary's natural brother, celebrated as the Regent Murray. The enmity entertained by the house of Guise towards both these young men, and the state of affairs in Scotland, induced them to forego the honour of that voyage. They remained at home to become, "the one," as Dr Robertson expresses it, "the most powerful, and the other, the most popular leader of the Protestants in Scotland." The character of Argyle was loftier and less selfish than that of his early companion, the Lord James, as the bastard was then called; and although he ardently co-operated with him for the establishment of the reformed religion, his career was not in like manner tainted with worldly ambition, or unfeeling disloyalty and duplicity to his sovereign. When Mary returned from France, he was sworn a privy-councillor; and

* Wishart, bishop of Edinburgh, the celebrated historiographer of the great Marquis of Montrose, was much domesticated in the family of the first Lord Napier. In his memorable history, the Latin edition of which was hung round the Marquis's neck at his execution, he observes, "About this time the Lord Napier of Merchiston departed this life in Athole,—a man of a most innocent life and happy parts; a truly noble gentleman, and chief of an ancient family. One who equalled his father and *grandfather* Napiers (philosophers and mathematicians famous through all the world) in other things, but far excelled them in his dexterity in civil business."—*English edition, Haghe*, p. 148.

also presided over the supreme criminal jurisdiction of the country, having succeeded his father as Lord Justice-General. Although this nobleman sacrificed no principle in his attachment to his sovereign, and was occasionally in the ranks of her opponents, he abhorred the ill-judged and shameful rigour with which Mary, from first to last, had been treated by her rebellious subjects; and when he ultimately ranged himself on her side, the Earl of Argyle only followed the dictates of honour and humanity.

With this illustrious house the family of Merchiston was doubly connected; Archibald Napier's mother being the daughter of Sir Duncan Campbell of Glenorchy, a distinguished scion of Argyle, (from whom flow the Earls of Breadalbane,) while his great-grandfather, also Archibald Napier, had married, as his third wife, a sister of the same Sir Duncan. Accordingly, Argyle was the friend and patron of Merchiston at the very commencement of the Reformation, when he made him his deputy in the criminal court.

Another distinguished leader in the Protestant cause was Sir Colin Campbell of Glenorchy.* He was the nephew of Archibald Napier's mother, and the same who, with the Earl of Argyle, met Knox at Castle Campbell during his temporary visit to Scotland, and pressed him to remain. The account of Sir Colin, contained in Nisbet's heraldry, says, that "he had the character and reputation of a gentleman of great wisdom and prudence. He was among the first of his quality who went into the reformation of the church, not in a tumultuary but regular manner, by addressing the queen-regent to grant the reformers the exercise of their religion, at least till matters were regularly settled in a legal way; and was on the side of the reformed in the Parliament 1560." He was one of the commissioners for settling the government of the church in 1573, and died in 1584.

Among the relatives of Merchiston who must have been most influential with that family, the barons of Tullibardine, also doubly connected with it, deserve to be particularly noted. Sir William Murray was one of Archibald Napier's tutors, and his uncle, by marriage with his mother's sister,

* In 1560, says Archbishop Spottiswood, "for fulfilling the article whereby the Lords were tied to send pledges unto England, Colin Campbell, cousin to the Earl of Argyle, Robert Douglas, brother to the Laird of Lochleven, and Ruthven, son to the Lord Ruthven, were delivered to the English admiral, and by sea conveyed to the town of Newcastle."

Katherine Campbell. He stood at the head of the Protestant barons in the year 1559; and was one of ten, selected from only twenty-nine nobles and gentlemen, who then upheld the cause, to compose a council to manage the affairs of the congregation.* He died in 1562; but the zeal of his house did not expire with him. His son and successor, also Sir William, Merchiston's cousin-german, was one of the bravest and best of those Scottish chiefs, without whose countenance and stalwart aid, the voice of John Knox might have destroyed the Cathedrals, but would never have reared the Kirk.

The justice-clerk, Sir John Bellenden of Auchinoul, must not be omitted. In the words of the old justiciary record, which I have elsewhere quoted, "he and the lard of Merchamstonis wife wes sister and brether bairnis;" and thus he was also the cousin-german of her brother the Bishop of Orkney. He belonged to the party of the queen-regent even after Argyle and the prior of St Andrews had forsaken it, and was one of the commissioners appointed to treat with the lords of the congregation in July 1559. Knox, speaking of what he calls a "proclamation set forth by the queen-regent to blind the vulgar people," dated in August of that year, adds, "this proclamation she sent by her messengers through all the country, and had her solicitors in all parts, who painfully travailed to bring men to her opinion, amongst whom, these were the principal, Sir John Ballantyne, justice-clerk, Mr James Balfour, official of Lothian, Mr Thomas and Mr William Scott, sons to the laird of Balwerie, Sir Robert Carnagie, and Mr Gavin Hamilton; who, for fainting of the bretheren's hearts, and drawing many to the queen's

* See Dr Cook's History of the Reformation. I presume it was the *elder* Tullibardine who, in 1559, was of the council of ten to manage the affairs of the congregation. In that year, some of the mercenary foreign soldiers, who then lived upon our unhappy country, mutinied for lack of wages; and, says Knox, "they made a fray upon my Lord Argyle's Highlandmen, and slew one of the principal men of his chamber, who, notwithstanding, behaved himself so moderately, and so studious to pacify that tumult, that many wondered, as well of his prudent counsel and stoutness, as of the great obedience of his company. The ungodly soldiers, in hatred of goodness and good men, continuing in their disorder, mocked the *laird of Tullibairn*, and other noblemen who exhorted them to quietness." The then laird was Sir William Murray, the grand-uncle of our philosopher. From him, in lineal male descent, flowed the Earls of Tullibardine, Dukes of Atholl, and Kings of Mann. The double connexion with Merchiston was this,—Christian Murray was the mother of Elizabeth Menteith of Lennox and Rusky, and daughter of Sir David Murray of Tullibardine.

faction against their native country, have declared themselves enemies to God and traitors to the commonweal."* Before the end of that same year, however, the justice-clerk had joined the Protestant church militant, though, according to the graphic account of the same not unprejudiced author, he by no means distinguished himself in one of its early brawls. "The feeble," says Knox, "among whom the justice-clerk Bellenden was; fled without mercie." But, however feeble as a soldier, he was an acute lawyer and wily statesman. In 1547 he succeeded his father, John Napier's grand-uncle, in the office of justice-clerk; and in 1554 was repeatedly employed in the important negotiations for the peace with England. When the war of religion commenced, he ranked high in the councils of Mary of Guise, who shortly before her death in 1559, transmitted to her daughter in France, a list of those upon whose talents and affections she might depend. He was chosen a privy-councillor on the instant of Mary's arrival, and took a principal part in all the councils and intrigues which led so rapidly to her ruin. There is a curious notice of his accomplishments in a letter from Throckmorton to Queen Elizabeth, dated 20th August 1567, on the subject of the conference which took place with the French ambassador when Murray became regent. "Mr James Macgill," says Sir Nicholace, "pronounced all the premises in the Scottish tongue, which, upon De Lignerol's desire, was interpreted into French by the justice-clerk." This worthy was also doubly connected with the Merchiston family. Besides the near relationship already-mentioned, he married (his second wife) Janet Seton, who was the aunt of our philosopher's father, by the half-blood, and a favourite maid of honour to Queen Mary.†

But one of his nearest relatives, who were remarkably prominent during the stormy and eventful period of his youth, was his mother's brother Adam Bothwell, bishop of Orkney. He deserves to be particularly noticed; for to this courtly and luxurious prelate we trace what appears to be the first anxiety expressed on the important subject of John Napier's education. Although he was the first reformed bishop of Orkney, no prelate of the ancient regime could have been more studious of his ease. He seems to have joined the infant church, rather from a sense of the staggering state of the old religion than because he entertained a violent distaste for its corruptions. He succeeded his brother William‡ as rector of Eskirk in 1552; and was only about thirty years of age

* Knox's History.

† See the Preface.

‡ William had succeeded their uncle Richard.

when the vacancy occurred in the see of Orkney, which he was selected to fill.* His immediate predecessor was Bishop Reid; a most distinguished prelate, statesman and patron of letters; president of the College of Justice; and one of the unfortunate ambassadors who were sent to arrange the preliminaries of Mary's marriage with the Dauphin. Most of these, and among the rest Bishop Reid, died, under strong suspicions of poison, on their way home in 1558.

Among the Merchiston papers I found, what had hitherto escaped observation, the bishop's part of a correspondence with his brother-in-law and sister, which he seems to have commenced on taking possession of his see about the end of the year 1559,† and to have continued until he went to join Queen Mary in France on the eve of her return to Scotland. These letters furnish some curious glimpses of affairs, and contain the only notices of our philosopher when a child hitherto discovered. They are chiefly interesting, however, in the light they cast upon the private character of one of those statesmen, who, if the fair fame of Mary Queen of Scots was the victim of a vile political cabal, had been an arch-conspirator against her. To look into the bosoms of those who spread with infinite art their toils around her, has by that very art, been rendered indispensable to her exculpation; though it is consolatory to find that such minute inspection is equally necessary to determine her guilt, which yet remains a question the most interesting in the history of Scotland. Into the bosom, therefore, of this wily bishop we shall look as far as possible; and by comparing his letters with his political career, add another proof to the duplicity at least of Mary's accusers. If it was through evil counsel that she married Bothwell, this uncle of our philosopher counselled that act. If guilty passion prompted her,—he pronounced the blessing of the Protestant church over them, and joined their hands. If she was innocent,—he foully and falsely accused her. If *the casket* contained forgeries,—he was deeply an accessory to the most heinous instance of that crime that ever outraged justice and humanity. If it contained incontestible proofs that this young and beautiful queen was a hardened, unshrinking murderess,—then he had been silent when he ought to have spoken, and is not free from the imputation of an accomplice.

* From the Register of the privy-seal (xxx. 11.) it appears that Adam Bothwell was preferred to all the temporalities of the see of Orkney on the 11th October 1559. He is designed Bishop of Orkney in the grant; and must have been elected by the chapter some time previous to that date.

† Some of these letters do not mention the year in which they were written; but, upon com-

From some expressions in the latter will of Sir John Bellenden, it would appear that he had stood in the place of a parent to his cousin Adam Bothwell; and probably he had also been the means of his promotion. The following letter to the laird of Merchiston seems to complain that the justice-clerk presumed upon this patronage, to make free with the bishop's revenues:

"To his Bruder ye Laird of Merchinstoun, in Merchinstoun.

"Darrest Brother, Efter all hartle recommendation, pleis wit I ressauit ane wreting of youris fra James King, be the quhilk ye schew me ye haid wretin dyvers tymes to me, and mervalet that ye haid gottin na anser; treule other na that wreting, I gat naine fra you this gryt quhyill, quhairfor think not onkuith that I wreit na anser of that thing I ressauit not. As to the knawlege of my being, quhilk ye war desyrus of, it hes bene in continuall travell and labour of bodye and mynd and euill helth thairthrow continualle sene my cuming in this cuntray, as this berar can reherse and informe you sufficientle. Alsua quhat cummeris* sume frendis hes sterit oup unto us, and how the samin standis with us presentle, James Meinzes will reherse you; prayand you hartle to rekkin, that all the cumer that can be maid me sall not caus me to geif ouer that thing suld be my supple in time of neid, and that otheris weill deserving suld bruik efter me: bot gif thais that hes done me plessuir will resaiff sic thankfulnes of me as of thankfull mynd I am willing and glaid to do thame, I sall be about to do thame mair plessuir, and acquyt the benifet done to me mair thankfulle than ony in Scotland that euer ressauit sic guid deid. Prayand you, that gif ye cum in commonyng with ony man thairanent, schaw how I haif offeret the iustice-clerk, haiffand† vpone this benefice xi hundreth merk of pension, yeirle to be geiffen out of the quantite of xx. chailder beyr, quhilk is mair than I haif to sustene me one behind, and gif the victuall com to sic pryces

paring their internal evidence with the dates that are given, the first letter quoted appears to have been written upon the 26th October 1559, (twelve days after the bishop's appointment to the temporalities of his see, of which he had just taken possession,) and the rest to follow as arranged.

* *Cummar.* Vexation, difficulty, entanglement. E. Cumber. Deliuir vs fra all dangears and perrelis of fyre and wattir, of fyir-flauchtis and thundir, of hunger and derth, seditioun and battel, of pleyis and *cummar*, seiknes and pestilence, &c. Archbishop Hamiltoun's Catechisme.—*Jamieson.*

It was a conspicuous prayer in the Bishop of Orkney's Catechism too.

† *Haiffand.* Having, possessing.

as it hes bene guid * chaip within this schort spaice, I wald not haif sua mekil behind my pensions as ether mycht pay that or susteine myselff; quhairfor pray him to be ressonable, and ramember him, that he that wald haif all, all is able to tyne. Alswa pray him to put ordour till his demandeis; for gif he continowis as he hes begoun, I may find rameid thairfor sik as I best may, althocht it stand not with his plessuir, and I war laith thairto in respect of amite: I haif heithertillis borne that I will be absoluit fra, gif he, as ye gait,† castis doune with his fuit sic plessuir as he hes done me. And mak my hartle commendanes to my sister, quhem, with you and my navows, your bairnis, the Lord God mot eternallie preserve in weilfair of saull and body. At the yairdis, this xxvi day of October, be

Your bruder at his powair the

BISHOP OFF ORKNAY."

The next letter seems to have been written in December following, and affords rather an amusing picture of the cunning and worldly mind of the writer.

" To his Bruder the Laird of Merchinstoun, thair.

" Rycht honorabil schir and bruther, Eftyr all hartle recommendatioun, pleis wit, this present is to schaw you of my helth, and quhow all affairis standis with me, quhilkis ar at syk punt that, althocht friendis hes steret me owp mair cummer nor lyis in thair powair to lay to me againe, that I remaine yit constant at my purpois that is to do thaim plesour that newer deserwet ewill off me, off quhilk numer ye ar; not dowbtand bot ye will continew and adverteis me quhatt is your opinion off all matteris, and quhair away ye beleiff all sall turne: this ye may do sua weill awysetle, that I may haiff knawlege off my desyr, and ye nathing hairmet thairthrow; quhilk I pray you obmit not with the first that passis betwix, and be labourand to put off cumeris off me that others quhilk suld be frendis dois all thair powair to bring on, or at leist get me wit thairoff, and mak me with the first ay adverteissement; and spair not to fee ane or twa futte fallowis to do the samyn with, quhatt evir thai cost I sall pay it. Alsua get wit of my gossop Alexander King, quhat he hes donne anent the enterie off me unto the landis off Briglandis and Estown off Dunsyr, quhairinto I pray

* I find in Jamieson, " gude, guide, good, to manure," &c.—" They *good* their land with seaware, and lightly midden muck." MS. Adv. Libr. Barry's Orkney, p. 447: "*cheap as dirt*" probably answers to the Bishop's phrase.

† Goat.

you beyr help as I wald do giff I war present in ony causs concerning you; and that becaus ye haiff enteres; and than I doubt not bot I will forder the better, notwithstanding the iustice-clerk reprochet me be wryt, sayand, that my sairry frendis that I chairget with my bissines left all in the myrre, and culd do me na guid. Schir this is litill off his evill speiche; I haiff not laissair to wryt off the laiff, and off his unkind behavour towart me, quhilk sall never vantaige hym ane d.* as I tak God to witnes, for that is not the way to conqueis me; nor he sall never haiff me be that moyen. Treit my sister the berair weill, and hald hir, sua far as ye may, in thai pairtis; for I haiff gottynne off hir word nor deid heyr away litill guid or eiss, bot continualle at debait with hir husband,† becaus I wald not geiff hym all that I haid quhill I get mair; be hyr caussing; and sua hes beynne hethirtillis be my awin maist hurt off ony. Commend me hartle to my sister your bed-fallow, and your sonne Jonne, quhem with you and the remanent of your succession, God mot preserff. At the Yeards, the first off December, be

"Your bruder the

"BISCHOP OFF ORKNAY.

"I pray you Schir, schaw you kynd to Alexander King for my saik."

To this letter, the following affords a remarkable contrast. It seems to have been called forth by one from his sister, complaining that her husband was no longer her lover. But the bishop's precepts are totally opposed to his example; and the ghostly comfort and advice he bestows upon his favourite sister, to bear patiently her crosses as the signs and tokens of God's love, is precisely the reverse of his own conduct through life.

"To his darrest Sister, Jene Bothwill, Lade of Mercheistoune.

"Darrest and best beluiffet Sister,—I commend me hartle to you. I ressavit your wreitting fra the berer, making mention that thair is sume variance betwix you and your housband, and that ye ar not sua luiffet of him as ye war wont; and I am sorie that ye suld be at sic disease,‡ and specially I beyng sua far removet fra you, and in sic tyme as I might haif worse supportet you of

* Probably meaning "ane doit," or d. for *denarium*, a penny.

† The parties to whom the bishop alludes, are his sister Margaret, and her husband Gilbert Balfour, to whom she was married some time before 9th April 1559. Gilbert was a brother of the celebrated Balfour, parson of Flisk, who became president of the Court of Session, and is the reputed author of the Pratiques of the Law of Scotland.

‡ Want of ease,—uneasiness.

ony tyme that hes passit sen my cumin in this roume. * Bot alwayes, sister, accompt with yourself, that sic trubles as hes happinet unto you ar the visitations of God, to pruif you, to try you gif ye luif him; and ar, as the croce of the fathfull uses ever to be, the fatherle cheisteisment and maist speciall singis † and evident taikinge of Goddis onedouttet favour and luif toward you; quhome as he hes beyne protectour, guvernour and defender of in tymes passit, sua dout not bot he will be in tymes cuming; and reconsall you with your husband in gaynning ‡ tyme, to your gryt contentment; geiffing your croce sik ane ysthew and end of joy and glaidnes as ever the faythfulles croce uses till haiff. Prayand you to tak ye samin therfor in patience; saying with godle Job, gif we haif ressaivit guid out of the hand of the Lord, quhai suld we not alsua ressaive evill; and geiffin him maist hartle thankis therfor, attesting your godle and stedfast fayth in him, quhilk is maist evident in tyme of probane. And as for my part, notwithstanding my inhabilite that is happinet throu frendis mysusing, quhilk this berer will schaw you, ye sall ressaive of him threte libs. § and, as God furthers me, I sall send sume taikin to your housband for intertynement of amite. Committing you in the protection of the hiest. At the Yairdis, this 19th of January be

" Your bruther at all powair the

" BISCHOP OFF ORKNAY."

The following letter proves that Oliver Sinclair had married Katherine Bellenden, the bishop's mother, in her widowhood. It also contains an interesting passage in reference to the education of our philosopher.

" To his Bruder the Laird off Merchistoun in Loudeanne.

"Rycht Honourabill Schir and Broyer,—Efter maist hartle recommendatione: pleis witt, I haif send presentle with this berar, sume power and commissione to your nyghbuir the lard of Rosling, yourself, the schiref Olyfer Sinclair my guid-father, || and Alex^r King, coniunctle to commone, and, giff ye may,

* Place, or a possession.

† Signs and evident token.

‡ In time to come.

§ L. 30.

|| Oliver Sinclair was at one time Sheriff of Orkney; perhaps, however, the Sheriff of Edinburgh is meant. This minion survived his disgrace for many years, and was, it seems, still alive in 1582. Sir Walter Scott narrates the anecdote of him and the unfortunate upstart Earl of Arran, that " one day, when the favourite was bustling into the court of justice at the head of his numerous retinue,

mak appoyntement anent sic differentis as ar happinnit betwix the justice-clerk and me: quhairunto, Schir, ye ar maid juge in your awin causs: advyss gif be your jugement ye will condame your self for that thing quhilk is cumin to me throu my father; for ony weyr that may be maid me, without that chance of poverte compell me, sall not be me, God willing, induring my tyme be put in fremmit handis:* quhairfor in this behalf I will put you to cumir to labour concord; gif it may be haid upone sic heiddis as I haif geiffin power to you and your colleggis to offer: quhilk gif beis refuset, I pray you mak my pairt knawin till all honest men that happinnis to heyr of our debaitt; and, sa far as ye may, stay cummeris fra uss, quhilk I wait thai folkis will not leyf to bring one us sa far as is in thame: bot gif thai get thair intent thairthrou, thai will haif the mayr caus to vant thame thairoff; onlye, Schir, do that is in you to appoynt us gif the samin may be; failzeand thairof, lat him be at his vayntage of me; for gif he continouis in the stering of me oup mair cumir thane he hes alradye done, I sall suyt help at sik ane as I wait will mainteine my just caus agannis his violence, and all thais that will tak his pairt in wranging of me. I pray you, Schir, to send your sone Jhone to the schuyllis; oyer to France or Flandaris; for he can leyr na guid at hame, nor get na proffeit in this maist perullus wordle,—that he may be savet in it,—that he may do frendis efter honnour and proffeit as I dout not bot he will: quhem with you, and the remanent of our successione, and my sister, your pairte, God mot preserve eternalle. At the Yairdis in Kirkwall this v day of December, the yeir of God 1560,† be

"Your bruder at powair,

"ADAME BISCHOP OFF ORKNAY.

"I pray you, Schir and bruder, to dress the laiff off your colleggis to beyr you cumpanye for to dress thir affairis, becaus I may not laubour thairin in my absence."

The next letter affords a curious picture of the state of the times at the commencement of our Reformation.

"To the Rycht Honorable and his best beluiffet Bruther the Laird off Marchinstoun.

"Weilbeluiffet Bruder, I commend me hartle to you.—Pleis wit, I ressaivet

an old man, rather meanly dressed, chanced to stand in his way; as Arran pushed rudely past him, the man stopped him, and said, "Look at me, my Lord! I am Oliver Sinclair."—*Tales of a Grandfather.*

* Strange, unfriendly,—"wery and irkit in ane fremmyt land."—*Dougl. Virgil.*

† The Arabic characters are used in this letter in the date of the year, but not of the month.

your wrytin off Marchinstoun the xxiv day off December, lattin me knaw syk novellis as occurret, and sua specialle that I cunne you verry meikill thank thairoff; and specialle off the advertesseiment maid my lord James, * quhill he was in Strathbogy, be aine off the Sinclairis; quhaironto that ye may be the habillair to mak answer, pleis understand the caussis off thair setting fordeward off syk thingis: quhilk was, that thai beand instigat be the justice-clerk, quha maryet with thaime twa sisteris, † to loup in ane off my plaices callet Birsay, ‡ quhilk thai kepit, and thaireftyr onbesset the way quhairbe I was to cum haime from my visitatioun, § with gret nomber off commonis quhem thai pat than in beleiff to leiff frelie, and to knaw na superiouris in na tymis cumyn; quhilkis be Goddis graice haid na powair to hairme me, althocht thair uttir purpos was at thair hethir cumyn, to haiff alder slaine me, or taiken me: at quhatt tyme I caussed demande off the said Henrie Sinclair, cheiff off that conjuratioune, quhatt movet hyme to do syk thingis to me; and als quhat offence I haid donne hyme or any off the countray, to provok thaime to syk thingis in my contrair; quhairunto he promeisset to mak answer in wryt; and schortlie he gaiff me certaine petitionis, in quhilkis I findand petitionis and not answeris or ressonis of the injury doune to me, I schew thaime to the Schireff and said, Schir, now ye see thai haiff na just causs off taikin my houss or doyin me uther wrangis thai do; quairfor I requyr you in the Quenis name, to do me justice: quha, beand weill myndet to dress concord betwix us, wald use na chairgis apon hyme for delyvre off my houss, bot desyret me mak answeris to his petitionis; quhilk I refuset simpliciter quhill I haid my houss againe. Thir petitionis wes proponet be the said Henry and his bruder Robert, and certaine als weill geiffin as thaimeself, not exceding the nomber off xviii or xx; to the quhilkis the said Henry fader gainstowd, || calland hyme and the laiff fullis that wist not quhatt thai did; and said he wald on na sort consent the mess wer donne; lyk as sen-

* Murray, afterwards the regent.

† These two sisters of Sir John Bellenden married to Sinclairs, are not mentioned by the peerage writers.

‡ Patrick Earl of Orkney and his natural son Robert Stewart were tried and executed for their rebellion in Orkney in 1614 and 1615, especially for holding out against the king, "the castell of Kirkwall, the House and Palice of Birsay," also for the "intaking and manning of the kirk and steiple of Kirkwall, the castell thairof, and place of the yairdis." Thus it seems to have been long a favourite exploit to *loup into Birsay*.

§ This corrects Keith, who in his catalogue of Bishops says, that Adam of Orkney appears never to have taken any charge of his cure.

|| Which the said *Henry's father* opposed? &c.

synne he hes said, and biddin be with ane gret multitude off the commonis at the first heid court eftyr Yeuil, * quhen thai wer all gatheret and inquyret be certain off my messingeris, send to thaime to that effek, giff yai wald be content off mutatioun off religion, quhilk thai reffuset, and that notwithstanding I cloisset my kirk dorris, and hes thoilet na mess to be said thairin sensynne; quhowbeit thai wer sua irritat thairbe, that eftyr thai haid requyret me sindrie tymes to let thaime in to that effek, at last gaderet together in gret multitud, brocht ane preist to ane chapell hard at the scheik off the schamber quhair I wes lyand seik, and thair causset do mess, and marye certaine pairis in the auld maner. This was donne on Sonday last, quhilk I culd not stoppe without I wald haiff committit slauchter: quhairfor thai falzet far informet the lordis sua; quhilk I pray you hartle to put out off thair heidis be contrair information; and mak me frendis amangis thaime; for I am heir detainet with seiknes, and may not do for myselff as now; bot as sonne as I may, I sall mak to the gait fra I understand that ye haiff graipet the principal off the consailis myndis towartis me, and found the samyn ressonable; for I am certaine as my small frend the justice-clerk hes steyret me oup all sorte off cummeris heyr that he culd be Henrie Sinclair and Thomas Tulloch, sua hes he labouret thair my hurt sua far as he may: quhilk, Schir, giff ye may persaiff, I pray you mak me adverteissement, that I may provid for my affairis in caice thair wraith may not be mitigat; for I will not commit me to ane angry multitud. Your wrytin was veray comfortable to me anent the frendis ye schew me ye haid to do for me; but leiff [not?] thairfor to mak may; and the gratest rathest: schortle, bruther and Schir, I commit my lyff and honnour in your handis. Quhatever happen, I haiff maid ane charter to you and your airis off syk thing I haiff; quhairfoir subscrive ye the reversion I send to you be this berair; and put to your seill thairto; and quhatever chancis, ye nor your airis sall not be defraudet off your portion and pairt ye suld haiff off me. As to the landis off Briglandis quhilk I suld be enteret to; I pray you bayth speik yourself, and causs Alexander King speik Michaell Nasmyth that is with my Lord off Sant Andrews that is donatour to the waird and mairigge off the Laird off Man my superior quhem off I hald blench, and my superior alsua off the queine blenche; and, giff neid beis, compone with hyme as ye wauld do for ony your awin landis; and quhatt ye promeis I sall keip. At the maist ther is thairoff bot twa yeiris to rynne off the waird. This, Schir, ye may do giff the said Michael cumes to the toun; failzeynne thairoff, witschauff ane servand apon my expensis, and I sall quyt it to pass to Paslay quhair he is. All uther thingis

* Christmas.

M^r^ Frances and this berair kan reherss you. Quhairfoir, I will not distaine you with lang wrytin; bot commendis you with my sister, your wyff, and my awin bairnis, your successioun, in the kepin off the Almytty. Prayand you hartle, Schir, to mak my commendationis to thaime and all other frendis. At the Yeardis, this feift of Februair anno lx°, [1560,] be

" Your bruder at his utter powair,

" ADAME BISCHOP OFF ORKNAY."

Upon the first day of the year 1561, (25th of March) that in which Queen Mary came over from France, the bishop again wrote to his brother-in-law as follows:

" To the Laird off Mercheistoune.

" Rycht Honorabill Schir and Brother,—Efter all hertle commendatioune, pleis witt, I ressavitt this day ane wreitten of Mercheistoune, the ix day of Merche, answer of ane other wreittin of mine the v of Februar, and hes understand thairbe your vigilant favour in the dress of my bissines; quhairof, Schir, I bliss God and thankis you. I can na wayis rameid, bot onefrendis * sall saye the wors of me; bot I sall keip that thai sall not haif the moyane to saye trewlie ony evill of me. As to the first pairt of the complaint that is geiffin in to the lordis one me, I wreitt sik informatione to you befoir, that I beleif, gif ye plesit to informe the lordis in that poyntt, thai suld be thairby satisfeit. As to the second poyntt, I nay it utterlie that the samin can ever be verefeit; altoght I haid guid caus to haif done the samin to our soverane, and to all that mycht haif holpit or supportit my caus. I pray you to mak and entertinye the moneast frendis ye can; and mak my hartlie commendationes to my Lord of Kylmauris, † assuring him that we sal be fund thankfull folkis for sik kyndnes as he hes schawin us. And the narration I maid you is veritable, and I will mak it guid, and of other mair sene syne, that may infuse my caus amangis all men; and whow-evir it be, I sall be fund the hounest man, and my adversairis luid liearis. As to the wreittingis that ar send, quhilk contenit plaintis, I did bot as I haid caus, and hes beyne thankfull to the gentill-man ye waitt of. At this time gif he recompensis me with evill, I may weill tyne this, bot I sall tyne na mair. As to the inspectioun of my wreittingis quhilk he hes

* *i. e.* enemies.

† I presume this was Alexander, fifth Earl of Glencairn, particularly distinguished as a sincere and upright champion of the Reformation, and called " the Good Earl."

gottin, that was wreittin to my Lord James,* I regard it not, and farles his menaces; for and he war heir, and soght me be oneressonable wayis, he suld haif nathing bot evill will and sad straikkis, and his allya with him. As to the evidentis quhilk ye mak mention of in your wreittingis, I was in purpois at the wreittin of your wreittin to send thame; bot becaus I tuik purpois to cum till you, I thocht not expendient till committ thame to ony messinger quhill I cum myself; assuring you, Schir, that the mair onkyndnes I thollit for the keipin of favour to you and youris, and the preserving of your ofspringis apperand rycht; the mair constantt am I at the samin purpois, and salbe, God willing: quha mot evirlestinglie preserve you and my sister, your bedfellow, and your ofspring, my bairnis. At Mousbollus in Orknay, this xxv of Merche, be

"Your bruther at all powair,

"ADAME BISCHOP OFF ORKNAY."

The following letters from the members of the bishop's household are also curious, and prove that he fufilled his threat of going in person to France, to lay his grievances before the young queen, who was now on the eve of embarking on that sea of troubles where her fortunes and her fame were shipwrecked. No wonder that she grew sick and fevered, and looked with weeping eyes back to her beautiful France. The most luxurious crown in Christendom had just departed from her; and, as an earnest of that which was to replace it, she was now hailed with disputes and grievances from her native shore. On one side, her bastard brother reminded her of the ascendency of Protestanism; on the other, John Lesly (afterwards bishop of Ross) warned her, in the name of all the saints, against the intrigues and ambition of her faithless brother; and between whiles, that indefatigable bore the Bishop of Orkney fatigued her with complaints against the justice-clerk.

The two next letters are, of the same date, addressed to the Laird and Lady of Merchiston, by one James Alexander, who seems to have been a relation of the bishop. †

* Murray, afterwards Regent.

† Among the bishop's legacies I find, "Item, to James Alexander, the soume of ane hundreth merkis, to-gidder with his obligatioun of xx merkis." The third son of Andrew Alexander of Menstrie was James, who had a charter to James Alexander in Menstrie, of an annual rent out of Lancarse in Clackmannanshire, 30th May 1584.—*Wood's Peerage*, ii. 536. If this be the

" To the Honorabill the Lard of Marchzestoune.

" Rycht Honorabill Schir and Traist Frend,—Efter my maist inwart and hartle recommendatione of service, it will ples your m^r* wit, at the wretine of this present, me Lord, my maister and your brothir, was departit of his Lordschip's ples of Kyrkwall, and passyt to the schype quhairine his Lordschip was myndit to depart into, and, be the grayce of God, to pass in France to vese the queny's grace, our maistres; and is of purpos to remane at the schype quhill God provide the wynd and wadir, that his Lordschip may pass to the completing of his Lordschip's voaig. And as anent the ocatione of his Lordschip's voaig and interprys at this tym, is to lament his Lordschip's extorsyone done to hym in the partis quhair his Lordschip hes cur of; and in lyk manner, the oppressyone that is done to uthir frendis; the quhilk his Lordschip beleifis that his maistres sall caus rameid to be put thairto as affeirs. And ye sall wit, that afoir his Lordschip's departing, hes maid his device and legasè, as it afferit to be done, and hes left your m^r ane of his Lordschip's executoris, and hes left your sone his Lordschip's air; and intendis, gyf God prolongis his Lordschip's dayis, to agment that airschyp to the gret weill and prophit of your m^r and your airis and his. Farder, your m^r sall reseif fra this berar ane aquytans of Gylbart Balfouris apone the somys of mone the quhilk your m^r was akit in the buikis of cunsell for to the said Gilbart; and me Lord hes dessyrit your m^r quho sone that ye haif reseifit this his aquytance, and that your m^r may be at laisser, that your m^r caus this acquytance be insert in the buikis, and the act quhair your m^r was actit to be distroyit. And as to the uthir affairis of this cuntra, the berar can schaw as me Lord hes bene usyt, and as thai intend to us his Lordschip's servandis efter his Lordschip's departing, gyf thai may. Als me Lord hes prayit your m^r to speik the justice-clark,† and the uthir Lordis of Sessyone as your m^r thinkis gud towart the mater betweix his Lordschip and Tomas Tulloch. The said Tomas hes

same, Merchiston's correspondent was paternal uncle of Sir William Alexander of Menstrie, the celebrated poet, who obtained a charter of the territory of Nova Scotia in America, 10th September 1621; with the power of making and endowing baronets, &c; the same who was created Viscount Stirling, Lord Alexander of Tullibody by patent dated at Windsor 4th September 1630. He had a grant of, and colonized Long Island, and thus founded the flourishing State of New York. James VI. used to call him his philosophical poet.—*Wood.*

* Your mastership, probably; or, as one might say, your worship.

† Bellenden was not only justice-clerk, but had obtained a seat on the bench. In those days the clerkship was not merely nominal.

raissyt new sommandis, and hes execut the letteris afoir hys Lordschyp's departing: I beleif the day be the xxv of May. And to his cusyng Jhone Kynkaid, he hes rafussyt to remane in this cuntra, for quhat caussys I kna nane; for I will assur your m^r^ that it was me Lord's intent and mynd to haif done [him] gret honor and plesour gyf he wald haif remanyt; the quhilk your m^r^ and his uthir frendis will knaw quhen it plessys the Lord God that his Lordschip and frend meitis: the quhilk Lord mot preserf your m^r^ in prosparete wyth gud heill. At Kyrkwall, the xx of Aprill [1561] be

" Your m^r^ servand and frend,

" JAMES ALEXANDER."

" To the Ladie of Marchzestoune.

" Maistress—Efter my maist hartle recommendatioun of service to your Ladyschip, it wil ples your Ladyschip wit, that me Lord your Ladyschip's brothir is, at the wretyng of this present, blyth and weill in halth, thankis to the Lord God, fra all the havie trybbill and cumyris his Lordschip hes had in tymys past; the quhilk trybbyllis gyf your Ladyschip had knawyne be quhat personyss thai war moifit, ye wald nocht beleifit. I wil expreme na namys, bot the occasyone of the trybill that mufit his Lordschip maist was nocht done be na Orknanaze borne. Albeit that the Synklairis maid insurrectioun agane his Lordschip, he wald nocht haif regardit that one thyng gyf his Lordschip had wantit the occatioune of dissplesour done to hys Lordschip be thame that his Lordschip confydit maist into presentlie for the warldis part; bot, as now, thankis to God, his Lordschip's mynd is releifit of the maist part of the occatiounis. Atour your Ladyschip sall wyt, that at the tym of his Lordschip's seiknes, as his Lordschip was mervallis seik and beleefit nocht to haif recuverrit, thair was na speciall persone that his Lordschip was myndit to haif left his Lordschip's heretag, pois of sylver that his Lordschip had for the tyme allenrenlie bot to your Ladyschip's housband, your self and your airis; and this I mak your Ladyschip assurit of. And now presentlie at his Lordschip's depertting, his Lordschip hes maid his deviss and lagesé, and hes nemyt your Ladyschip's housband ane of his Lordschip's executouris, and your sone to be his Lordschip's air in all thyngis pertenyng to heretaig; quhairfoir your Ladyschip may beleif surlie to haif ane faithful brothir and ane kynd Lord, gyf God prolongis his Lordschip's dayis; the quhilk your Ladyschip and all his Lordschip's gud frendis aucht to pray for. Farder, your Ladyschip sall wit anent your cusyng

Jhone Kynkaid, that me Lord is varay myscontentit that he wald nocht remane in this cuntra; consyndirane that his Lordschip send for hym affectuoislie, bayth to haif done hym prophit gyf he wald haif remainyt in the cuntra, and to set fordwart his Lordschip's honor in his absence; bot I will assure your Ladyschip that he wald nocht remane wythout me Lord wald haif put awaye the constabill Gylbert Balfour* instantle, quha hes intrametit wyth this yeiris fruttis, and can gef na compt of his Lordschip fruttis of this yeir, he beand put awaye; and to haif maid hyim chalmerlaine, the quhilk office, gyf me Lord wald haif gyfin hym, is nocht gaynand for hym; bot nochtwythstanding he wald haif maid hym hail bailzie, and kabtane of hys Lordschip's pless; and promest, gyf Jhone Kynkaid wald us that weill, and remane quhill his Lordschip's returnyng, that he suld haif his dissyris fulfillit; and gyf Jhone makis ane uthir rehairss to excus hymself, and to put the weit to me Lord, belyf it nocht; for I assur your Ladyschip it is trew that I haif wretin; quhairfoir gyf your Ladyschip speikis wyth his modir, or anie uthir frendis, schaw as I haif wretin; and lat nocht me Lord be murmuryt wyth na frendis; I wil wrat na mair as now, bot the eternall Lord preserf your Ladyschip. At Kirkwall the xx of Aprill [1561] by

"Your Ladyschip's cusyng at powar,

"JAMES ALEXANDER."

Another worthy, Francis Bothwell, now takes up the pen, a nephew of the Lady of Merchiston; and one who appears deeply interested in her welfare and her family's, no less than in that of the bishop, whom he pronounces to be a man of an extremely facile disposition:†

* This corrects a prevalent idea, that Gilbert Balfour was put in command of the Castle of Kirkwall by the Earl of Bothwell, or Queen Mary, for political purposes.—*See Whitaker's Vindication*, and *Peterkin's Antiquities of Orkney*.

† Adam Bothwell had not yet availed himself of the Protestant privilege of a wife, so this Francis could not be a son of his born in wedlock. Though it was the custom of the clergy in those days to have natural children, he appears not to have been young enough to be a son of the bishop, who was not much above thirty at this time, and the General Assembly made no such accusation against him. The writer, therefore, must have been a son of one of the bishop's brothers, Richard, or William. In the records of justiciary I find, under date December 9, 1561, that "Mr Alexander Dick Provost of Orknay, Schir Magnus Ramsay Chaiplane, Schir Duncane Ramsay Chaiplane, in Orkney, found caution this day; and (on Dec. 5,) Edward Sinclair bruder to the Lard of Rosyln, and ten others. Mr Magnus Halcro, William Halcro, Nicholl Chalmer, and

" To his darrest Antt Jane Botwall, Lady Merchyngstoun.

" Darrest Antt,—Efter hartlie commendatioun, ye sall understand that my Lord your broder, hes tane purpos to pas in Franche, God willyng, and for the gud of hymself and all his freindis, sua that God Almychty geif hym prosperite in his vaiage. And in the tyme of his departyng, I spak hym effectuislie for to be gud unto you and your barnis, gif it chanche hym inlaik in the tyme of his vaiage; quhilk he shew in deid; for he institute, nominat and ordinat your son Jhon to be his undouttit ayr of all hes heretage, and your housband to be executour to hym also; and hes left to your dochter and Frances your son, in legasie, largilé of his geir: and quhen he wes seik, I being absent with you, efferand of his lyff, he schew sic greit kyndnes to you and your barneis, that he leift and gaif outt of his handis the effect of the mony that he had than, before famois wittnes; and commandit it to be delyverit to you and your barnis; and this I have of hymself, and of thame that was maist secret than with hym. Thairfor ye aucht till have greit luiff to his Lordschip, for I assur you his Lordschip beris als greit luiff to your housband, your self and your barnis, as to ony that is in this present lyff; quhairfor I pray you speyk your housband effectiuslie that he await upoun my Lordis besynes in till Edinbrugh intentit and movit contrar his Lordschip be Thomas Tulloch of the Fluris; quhilk wil be upoun the xxv day of May nixtocum; and caus him requeist the Lordis of the Session that my Lord gaitt na hurtt nor skatht in na matteris intentit befor thame, untill his Lordschipis hame cummyng fra the Quenis grace service. This I doutt nocht bot ye wil be diligant thairintill, as your partt is for to do. Attour I will nocht latt you gang withoutt repruyff, and this is it. I schew you sum thyngis anentis sum personis, towart thair misbehavar towart my Lord, quhik he will schaw at the meittyng be you with hym; the quhilk thyng I bad you keip secrett; yit notwithstanding ye schew thame agane to your sister Mergratt,* quhilk scho vrait agane heir despitfullie, and causit cummaris to be amang us; of the quhilk my Lord

Freir Francis Bothwell, also found caution to underly the law on April 15 next, 'for convocatione and gaddering of our Sovrane Ladeis legis, to the nomer of iiij^{xx} *(four score)* persones in the month of September last bypast, ischeid out of the Castell of Kirkwall, and cumand to the toune thairof, and serchit and socht Henry Sincler of Strone, and Mr William Mudy, for thair slaughter, &c. and utheris crymes contenit in the letteris direct thairupoune.' After having been continued from time to time, the case was at length (May 13, 1562) referred to the Justiceaire of Orknay." —*Pitcairn's Trials*, i. 413.

* The wife of the constable of Kirkwall, Gilbert Balfour.

was gretlie offendat at you for the tyme; quhairfor apardon me in tyme cummyng till schaw you ony secrett bot only that thing quhilk I sett no by quha heir it; for thair was nocht ane word that I said to you,—and ye will keip the treuth,—bot I will byd be thame, and verefee thame in my Lordis presence, quhan it will pleis God us till meitt all togethir. Of this repruiff tak in patience, for it was writtyn heir be your narration, and thairfor my Lord bad me writt to you and repruiff you thairof in his name. Command my hartlie service to the Lard, and Jhon, and my awn son Frances, and to the rest of my gud frendis: nocht ellis, bot ye leving Lord keip you now and evir. At Kirkwall the xxv day of Aprill the yeir of God 1^{m} v^{c} lx ane yeirs, [1561.]

" Be yours at powar,

" M^{r} FRANCES BOTHWALL."

The last of this series of letters is from the same to the same, announcing the safe arrival in Scotland of Queen Mary and the Bishop of Orkney.

" To ane Honorabill Lady Jein Boitwall, Lady off Merchestoun.

" Darrest Antt,—Aefter maist hartly commendatioun, loving to God I haiff hard of the Quenis grace cuming hame, and off my Lord your brother's, quhairfoir I pray you that ye beir your self waisly and kyndly to his Lordschip: inlykwiss your husband, in sic ane maner that your husband be never frai hyme, and that for your greit weill and profeit; ffor I feir, be rasone that I am frai hyme, that thair sal be sum that sall labour in your contrary for to obteine that thyng the quhilk ye haiff Goddis rycht of. It is nocht neidfull to expreim the personis to you, for ye knaw them; ffor giff I war present with hym, I suld keip hyme that na man suld do you hurt in to your rychtis; ffor I knaw weill thair greit deligence that thai will mak one the ane pairt, and my Lordis facilite one the uther pairt; quhairfoir be ye deligent and waikryf; and gyf my Lord cumis nocht haistaly heir, bot is in purpois to remaine thair, labour ye, and caus for to labour, that my lord send about me to remain with hys Lordship; for your weill and uther fryndis; nocht that I desir to be in courtein or cummer, bot only for me Lordis weill: bot I prai you lat nocht my Lord wit that I wreit to you for ony affaris; for I wreit to you as ane freind, warnand you of inconvenientis that maye chance excep ye be the mair deligent: and weit nocht me gyff it be uthrewaiis nor weill; for quhene his Lordship and I depertit, he was als weill gevin to you and your bairnis as ye or I wald haif de-

sirit, as I wreit to you at lentht efter his Lordship's depertyng: and gyf it chansis me to cum in his cumpani, I wald trow in God that his Lordship suld continew in the sam luiff and favour that he had to you and your bairnis quhene his Lordship depertit; and thait na uther laboraris suld prevaill. The rest of this maiter I refar to your wisdom and your husband's. I wreit to you oft tymes of befoir and gat na answer as yit; thairfoir be nocht sweir in tymes cuming, bot adverteis of all thyngis ye thynk necessair. I sall send your hors to you all sone as I get passingiairis cumand betwein; for this com awaye at the poist and your naik mycht induir to cum with hyme.* And commend me hartly to the Laird and to Jhone, and your sone Frances quhilk I trest in God salbe als gud ane man as ever was in Lowdyene: nocht ellis, but the eternale God preserve you. At Kirkwall the xxviij daye of August [1561] be

"Your cusyng at the utirmaist of his powar,

"Mr FRANCES BOITWALL."

The name of Queen Mary suggests another near relative of Merchiston, with whom it is well that the family can counterbalance the stigma of the Bishop of Orkney. James Melville was the third son of Raith and Helen Napier. This lady had been left (by the judicial murder of her husband) with a large family of young sons in a miserable and destitute situation. But the consolation with which he endeavoured to soothe her, that God would provide better for her young sons than he could have done, proved true. The widow of James V., Mary of Guise, had too noble a soul to suffer a family linked by many ties to the memory of her own husband, to remain in a state of destitution. Some of them she took under her immediate care; but James Melville, a beautiful and engaging boy, she selected to be page of honour to her daughter in France. The fortunes of this youth, who became so well known as Sir James Melville of Halhill, are remarkable from their very outset. No fiction of romance or fairy tale can equal them in vivid interest and curious adventure. He moved, as if with a charmed life and reputation, through the storms of faction and the halls of princes of various courts; conspicuously active in them all, yet injured and sullied by none. The record of his adventures he bequeathed in the most authentic and least suspicious form; a private legacy in his own handwriting to his sons, as a beacon by which to steer their course in public life. †

* Sic.

† "Memorialis be Sir James Meluill, specefeing of matters whereintill he hes bene employed be sindrie princes, or has seen and vnderstand being in ther courtis or contrees. To serue for an

He was unaccused, so had no motive to publish a deceitful gloss upon his own conduct. He published nothing, so had no intention to prejudice after ages with a false view of his times, and the characters who compose them. He had the sacred and single-hearted purpose in view of reading a moral lesson to his children from the facts of his own life, in connection with the history of his country. "I grant," says he, "that thir litle triffelis ar not worthy to be put in wret, wer not to testify of God's gratious gudnes to the posterite of his faithful; as David rehearses in the psalme, 'I have bene yong, and am waxing auld, and yet I never saw the just abandonit, nor ther children.'" To this faithful record of the times, compiled by so near a relative of our philosopher, I may have frequent occasion to refer. His eldest brother, John Melville of Raith, was restored to the family estates by Queen Mary. Robert, the second son of Helen Napier, well known as an able diplomatist and statesman under the designation of Sir Robert Melville of Murdocairny, was long ambassador at the court of Elizabeth from Scotland; and one of Mary's dearest friends. He became the first Lord Melville. Sir Andrew Melville of Garvock, another of these distinguished brothers, was equally beloved by, and faithful to, his unhappy sovereign whom he served as master of her household in England until her execution parted them. Their names occur in almost every page of her tragic story, and of the diplomacy of the times. They were the grandsons of Sir Alexander Napier, who fell at Flodden; the nephews of Alexander, who fell at Pinkie; and consequently the cousins-german of our philosopher's father. Their sister Janet, already mentioned as the wife of the high treasurer Kirkaldy, emulated her mother in a son whose devoted loyalty to Queen Mary was only equalled by his determined support of the Protestant cause. "The gallant Grange" was thus the second cousin of the philosopher. He had participated in the murder of Cardinal Beaton, the only stain upon a shield which dazzled even the chivalry of France with the valour of a Scottish knight. An exile for that crime, he served in the wars of the Low Countries about the year

exempler of lyf and better behauor to his sonnis concerning the seruice of princes and medling in ther affaires."—*MS. printed for the Bannatyne Club*, 1827. "It must," says the able editor, "afford much gratification to those who take an interest in such researches, to learn that an original manuscript of Sir James Melville's historical work has at last been found."—*Preliminary Notice*, 1827.

It is a great pity that Dr M'Crie had omitted to observe this in his edition of the Life of Knox, dated 1831, wherein he still refers to a spurious and unfaithful print of this MS. which appeared in 1683; and attempts to throw discredit upon the authenticity of any testimony afforded by the most authentic and delightful memoirs in aid of history that are to be met with.

1553, under Henry II. and the high constable Montmorency. His nephew, James Melville, was then the favourite secretary of the constable, and at his side in battle. Melville narrates that his illustrious master—the most unlikely to be astonished by deeds of arms, or to waive his dignity—would not address Grange without uncovering; and Henry II. who took the proud style of "Protector of the Liberties of Germany and its captive princes,"—and while victorious over Charles V., pointed to this young Scotchman, in the presence and hearing of his uncle James Melville, with these memorable words: "Yonder is one of the most valiant men of our time."

From these his collateral relatives, so variously conspicuous in political history during the period of John Napier's boyhood and youth, we must turn to contemplate the conduct and situation of his own father. Some expressions in the Bishop of Orkney's letters, and also the circumstances of Sir Archibald's being honoured with knighthood in the year 1565, and the mastership of the mint about 1582, led me to examine the records more minutely, and to discover his first appointment to a high and responsible public office. In the criminal court of Scotland, the Earl of Argyle, hereditary justice-general of the kingdom, sometimes presided in person, but more frequently delegated his important functions. From the remnants yet extant of the ancient records of that court it appears, that upon the 16th March 1561, a few months after Mary's arrival in Scotland, "The justice principall being present, Archibald Naper of Merchinstone maid fayth in judgement that he suld use ye office of justice deputrie lelilie and treulie, as effeirs;" which, accordingly, he did for several years thereafter, and at a time when the country was so disorganized, and when learning no less than ignorance was so leagued with the darkest superstitions, that to direct an assize must have been a duty of no ordinary pain and anxiety to an upright mind. In a register which commences 12th March 1560, and ends 16th May 1562, the justice deputies named are "Sir John Campbell of Lundie, Mr Alexander Barroune of Spittalfield, and Archibald Naper of Merchistoune."* In one from 17th May

* The following royal letter, which I find among Sir Archibald Napier's papers, seems to refer to the period of his appointment to the office of justice-depute by the Earl of Argyle. The facsimile is of Queen Mary's signature, a few months after her return from France.

"Marie be the grace of God Quene of Scottis," &c. "forsamekle as in the absens of our

1563 to 17th May 1564, they are " Archibald Naper of Merchistoune, Alexander Bannatyne burgess of Edinburgh, James Stirling of Keir, and Mr Thomas Craig." This is the celebrated Craig, author of the great work De Feudis which forms so brilliant an epoch in the legal learning of our country. He sits for the first time on the 6th July 1563, very shortly after he had passed advocate. The Earl of Argyle is named as present on several sederunts. In the register which embraces from 24th May 1564 to 5th March 1565, there is marked, " curia tenta in prætorio de Edinburgh, 24 die May coram magistro Archibaldo Neper de Merchistoune, justiciarie deputato." I do not find a record of Merchiston holding this office after the year 1565. He must have received the honour of knighthood betwixt the dates of 24th May 1564 and 10th November 1565, which latter is that of the confirmation of the will of his spouse Janet Bothwell, wherein he is designed " Archibald Neper of Edinbellie, knycht." His colleague in office, James Stirling of Keir, whose daughter the philosopher afterwards married, was knighted along with Tullibardine, (Merchiston's cousin-german,) upon the occasion of Darnly's being created Earl of Ross preparatory to his marriage. This honour was conferred upon

traist cousing Archibald Erle of Ergyill Lord Campbell and Lorne, justice generall of our realme, in our effars concernyng the commone weill of our realme and quietnes amangis oure subjectis indwellaris of our ilis therof, our traist counsalour Sir Jhone Campbell of Lundy knycht, depute to oure said justice, in the meyntyme being vexit with sic infirmitie that he wes not able to serve in the said office of deputrie, upone that necessitie, and consideratione that oure liegis havand criminale actionis in courtis of justiciarie to be haldin in oure tolbuyth of Edinburgh suld not be hyndred in process therintill, oure derrest moder the quene regent of gude memorie happynit to grant commissionis of oure justiciarie in that parte to sindrie persones, sic as Alex. Bairrone of Spittelfeilds, Maister Edward Henrysone, and dyvers uther persones, quhilkis commissionis we understand ar providit to the office and commissione of our said justice general, quhairthrow he may not use the privilege thairof, as efferis, specialie be making of sic honorable persones in his deputtis as he will answer for to God and us." &c. [Therefore the queen annuls these previous commissions, and discharges all concerned from acting in virtue thereof.]

" Subscrivit with our hand and gevin under our signet, at Edinburgh the tent day of Januare, and of our regne the xix yeir." [1561.]

them at Stirling on the 15th May 1565, about the very period to which Archibald Napier's knighthood may be traced. *

In selecting his assistants, it may be supposed that the good Earl of Argyle looked for energetic minds sufficient to cope with the lawless turbulence of the times. The lower classes, in the great towns at least, were continually in a state of insurrection; and now it was under a sacred banner that anarchy veiled her unhallowed countenance. When we call to mind the raging of the populace, the ranting of the popular preachers, and the storming of the lords and gentlemen—all mingling with the blood of civil war and the tears of insulted royalty—it must appear much more pleasant to contemplate the infancy of our Reformation in the tenderly selected pages of church historians, than it could have been to walk the streets of Edinburgh in those days, or to preside in her halls of justice. There is one crime of which we do not find much notice in the mutilated records referred to, though other more conspicuous mutilations speak of it to this hour,—the destruction of some of our fine cathedrals, to which a depraved mob were then easily excited, as they might be to similar excesses in a less barbarous age. It is in vain for modern historians of the church of Scotland to speak of "the merit which belongs to the very men by whom the buildings were overturned," or to tell us, that "we must not forget to take into view, that without such a degree of *enthusiasm* as led to these excesses, the inestimable blessings resulting from the Reformation would in all probability not have been acquired." † The men who accomplished the Reforma-

* Many trials of importance occurred during the years when Napier held office. He presided upon the 16th March 1562-3 in the trial of Mr Adam Colquhoune, a gentleman of rank and property in Ayrshire, condemned for the murder of a man-servant. The sederunt is marked, "In insula vocata Halie-Blude Iill [aisle] loco pretorii de Edinburgh coram Archibaldo Neper de Merchinstone, justiciario deputato." On May 19, 1563, "John Archiebischop of Sanct Androis," and many others are tried for celebrating the mass, &c. a new crime in those records. Besides offences of this nature, the numerous "unmercifull slauchters," feuds, tumults, "umbesetting the gait," and violence of every description which characterize the period of his official duties, must have rendered them no sinecure. Within this period too, namely, on the 26th June 1563, "Agnes Mulliken *alias* Bessie Boswell, in Dunfermeline, was banist and exilit for *wichecraft*."—"This," says the indefatigable editor of the Ancient Criminal Trials in Scotland, "is the earliest existing case in the records of the high court of this nature; and it is almost the only instance of so mild a sentence having been pronounced."—*Pitcairn's Trials.*

† Dr Cook's History of the Reformation in Scotland. Dr M'Crie, in his Life of Knox, has

tion in Scotland were not "the rascal multitude." The cathedrals were destroyed by those who mingled their zeal for Religion with their passion for Robinhood;—who one day rioted for the "Lords of the Congregation," and the next for "the Lord of Inobedience;"—with many of whom it was matter of accident and indifference whether their convocation was for the mass, as at the door of the sick chamber of the Bishop of Orkney; or against it, as when their unprincipled outrages caused a priest to commit suicide.

The Church of Scotland was planted by such noblemen as Argyle and Glencairn; such barons as Tullibardine and Grange. It was rendered popular, and thus greatly aided, by such preachers as Knox and Goodman; and it became dignified in the eyes of Protestant Europe by its first and greatest theologian, John Napier.

also taken a view of the matter not reconcileable either with sound principles of Christian government, or with the facts and the opinions recorded by Knox himself.

CHAPTER III.

It may surprise the reader to find this honour claimed for the Inventor of Logarithms, who has hitherto been regarded only on his throne of science, and that by the limited number capable of appreciating his genius. The celebrated historian and philosopher who pronounced him to be the greatest man his country ever produced,* founded, probably, none of that estimate upon his theological merits; and more recent authors, ranking high among the historians of Christianity and theological learning in Scotland, have omitted to illustrate their subject with the most efficient example they could have found. I propose, therefore, before approaching him in the majesty of his science, to trace him through the progress of his education, and the perils of his times, until he be discovered on the *cathedra* of theology in Scotland.

With the rise of the reformed doctrines that of our learning is intimately connected. On the great field of the continent, human knowledge could expand even while bigotry kept her seat with persecution at her side. But within the narrow limits of Scotland, there was little to induce sages to quit, for her instruction, the richer and wider range of those countries where genius might feel that the danger of the path only enhanced its glory; and when with us the study of the Greek language, for instance, was condemned as heresy, and rendered those who indulged in such intellectual excursions objects of suspicion to a tyrannical priesthood, it was no wonder that learning shunned our shores.† Nothing can be more dreary than the prospect of letters

* David Hume.

† Boece records *George Dundas* as an excellent Greek and Latin scholar in 1522. He was

in a country whose rude legislature had to compel gentlemen to educate their eldest sons. In the year 1494, an act of Parliament passed in Scotland, imposing a fine of twenty pounds upon every baron and substantial freeholder who neglected to put his son and heir to school. The limited application of this statute, which seemed to consider the highest class of nobility entitled to the luxury of ignorance, savours, perhaps, more of barbarity than the enactment itself does of the revival of letters. Until the Reformation had made some progress, learning in Scotland can only be said to have exhibited occasional signs of animation. While the rest of Europe, including England, could point to such men as Petrarch and Erasmus, Regiomontanus, Copernicus, and Roger Bacon; Scotland had not distinguished herself in any department of human knowledge. No lasting achievement had obtained for her a place in the history of letters; and even the art which approaches nearest to instinct, that of medicine, found no Paracelsus there, when in 1543, just seven years before the birth of our philosopher, his grandfather Alexander Napier obtained the royal permission to go abroad, being "vexit with infirmities and seiknessis, of the quhilkis he may nocht be gudelie curit and mendit within oure realme." Poetry to be sure, like springs in the desert, gave freshness to the reign of James V., when Dunbar, Gawin Douglas, and Sir David Lindsay, put forth what

"Unto ears as rugged seemed a song;"

though, after all, not one of them could match the nightingale note, which James I. acquired during his long captivity in another land. But the highest flight of science and art which in Scotland illustrates the period alluded to, was when the Italian alchemist patronized by James IV., attempted to soar from the battlements of Stirling Castle upon wings of his own constructing; the result being, that he fell down and broke his thigh.*

master in Scotland of the knights of St John of Jerusalem. Dr M'Crie inclines to think that he must have acquired his learning on the continent. "The Bishop of Brechin, William Chisholm, hearing that Wishart taught the Greek New Testament in Montrose, summoned him to appear before him on a charge of heresy, upon which he fled the kingdom. This was in 1538."—*See Dr M'Crie's Note on the early state of Grecian Literature in Scotland, Life of Knox*, i. 343.

* He came into Scotland about 1508, and deluded James IV. with promises of the philosopher's stone. He attempted to explain the failure of his aërial expedition in this manner:—The wings, said he, were partly composed of the feathers of dunghill fowls, and so by sympathy tended downwards, which would have been otherwise had eagle's feathers alone been used.

John Napier is the great land-mark of the most important epoch of letters in Scotland. He is the first who, in the early struggles of our church, gave a decided impulse to its biblical lore, by a commentary on the most abstruse books of the sacred Scriptures, which for learning and research has never been equalled by any of his countrymen. At the same time, alone and unaided, he placed his sterile country upon a level in mathematical learning with those more propitious climes, Germany and Italy,—the cradle of astronomy, and the hot-bed of letters. It would be no less interesting than instructive to trace minutely the developement of his extraordinary faculties. But it is chiefly from traits afforded by the individual himself that the progress of so great an intellect can be intimately known, and autobiography was incompatible with the qualities of Napier's mind, and the nature of his achievements. Yet few could have left a more instructive diary of education. He had drank deeply of human knowledge at its most recondite fountains; and the Bishop of Orkney, when he urged immediate attention to his studies, had not cast his advice upon the waters, or falsely predicted the result. His illustrious nephew made himself acquainted with the heights and depths of learning. He read and studied the sacred volume in all its tongues. He could enliven his abstruse lucubrations with the beauties of the ancient classics. He was more than learned in science and philosophy,—he was a high priest in their temples; and the occult sciences were not left by him unexplored. Most probably it was the state of the country that prevented the advice of his uncle given in 1560 from being immediately adopted. In 1558 the University of St Andrews, the most celebrated in Scotland, became nearly deserted in consequence of the tumults of the Reformation; and in the following year, for the same reason, the faculty of arts were obliged to dispense with the public exhibitions of the graduates.* Yet Napier commenced his public education at an earlier period than has been supposed. It was in his fourteenth year, before the marriage of Mary to Darnly, and when the seats of learning were shaken by the storms gathering around the unhappy queen, that he left, for the first time, his paternal roof. His mother died in 1563; and in that same year he became a student in St Salvator's College.

Although this was three years after the Parliamentary establishment of the Reformed doctrines, St Salvator's was still remarkable for the divided state of

* Dr M'Crie's Life of Andrew Melville.

its opinions; and the keenness engendered betwixt the scholastic temper of the age and the magnitude of the question which agitated Europe, must have exercised a corresponding and decisive influence over many a youthful mind. In the mass of learned and minute information respecting St Andrews, afforded by Dr M'Crie in his Life of Andrew Melville, I find it stated that sometime at this period "the students were exercised once a-week in theological disputations, at which one of the masters presided, and the rest were present and took a share in the debate. The disputants were exhorted to avoid the altercation usually practised in the schools, and not to bite and devour one another like dogs; but to behave as men desirous of mutual instruction, and as the servants of Christ, who ought not to strive, but to be gentle to all." Napier, who throughout all his life was characterized by the utmost singleness of heart and the gentlest dispositions, appears, nevertheless, to have been able to keep his own, and even to play a conspicuous part, amid the gladiatorship of intellect affected by his youthful competitors. From the moment his mind began to work he aspired to be a Protestant champion, and applied his whole energies to that sacred cause. The fact is derived from his own words, which are the more interesting as they convey the solitary anecdote of his youth that is known to exist. In his address "to the Godly and Christian reader," prefixed to his Scriptural Commentaries, he says, "In my tender yeares and barneage in Sanct Androis, at the schooles, having, on the one part, contracted a loving familiaritie with a certaine gentleman, a Papist; and, on the other part, being attentive to the sermons of that worthy man of God, Maister Christopher Goodman, * teaching upon the Apocalyps, I was so mooved in admiration against

* "This Goodman or Gudman was an Englishman, formerly a public reader of divinity at Oxford, one of those Protestants that fled away under the reign of Queen Mary, and that fixed their residence at Geneva; in which city, in the year 1558, he published a little tract against his sovereign, under this title, 'How Superior Powers ought to be obeyed of their subjects, and wherein they may lawfully be disobeyed and rejected; wherein also is declared the cause of all this present misery in England, and the only way to remedy the same."—*Keith's History*, p. 145. This work of Goodman's was of the same nature as Knox's Blasts against the Monstrous Regiment of Women. But he had not the spirit of his friend and colleague. He emitted a mean-spirited retractation before the ecclesiastical council of Queen Elizabeth.—*See Strype's Annals.* Keith adds, "Thus it will be seen that this Christopher Goodman has been one of the same spirit with our Mr Knox. But it seems though Goodman made this recantation, yet Queen Elizabeth and her council have not thought it expedient to give him encouragement at home,

the blindness of Papists, that could not most evidently see their seven-hilled citie Rome painted out there so lively by Saint John as the mother of all spiritual whoredom, that not onely burstit I out in continual reasoning against my said familiar, but also from thenceforth I determined with myselfe (by the assistance of God's spirit) to employ my studie and diligence to search out the remanent mysteries of that holy Book; as to this houre (praised be the Lorde) I have bin doing at al such times as conveniently I might have occasion." Thus from himself we have an explanation of his long retiring habits, and, at the same time, such a picture of the early vigour and independence of his mind as to make us wish for more. A youth, under fourteen years of age, listening so intensely to an exposition of the Apocalypse from the pulpit, and bursting forth in disputation with his Papistical friend and companion, until he conceived the daring project of leaving not a mystery of prophecy unfolded, is a trait seldom surpassed in the history of boyhood. Galileo, when a few years older, was also roused to powerful activity in the house of God. But it was his eye that was attracted,—a characteristic difference betwixt the practical and the speculative philosopher which continued throughout their respective careers. In the cathedral of Pisa, to which city the young Italian had been sent for the benefit of an university education, he fixed his gaze upon the vibrations of a lamp. Amid the pageantry of that worship against which Napier warred, and of which Galileo was destined to be a victim, he watched, with the eye of an eaglet, the isochronal movements of the chain, and measured them by the beatings of his pulse. The result was the pendulum.

The time and the scene of Napier's early studies were the great epoch and arena of letters in Scotland, and deserve to be more closely examined. "Not to name the school or the masters of men illustrious for literature is," said Dr Johnson, "a kind of historical fraud by which honest fame is injuriously diminished." * The University of St Andrews became so celebrated that its

which very probably hath been the occasion of his wandering into our country. It were to be wished our men at the helm had equally discountenanced such firebrands. However, after a great many years he returned into England." He was appointed to the ministry at St Andrews at the same time that Knox was appointed to Edinburgh in 1560.

* Life of Addison.

fame spread over the continent. It was composed of various colleges, among which St Salvator's was highly distinguished. Precisely a century before our philosopher's birth, namely in 1450, it was endowed by that celebrated Bishop Kennedy, who, says Pitscottie, " founded a triumphant college in St Andrews, called St Salvator's College, wherein he made his lair very curiously and costly; and also he bigged a ship called the Bishop's berge, and when all three were complete, he knew not which of the three were costliest; for it was reckoned by honest men of consideration being for the time that the least of them cost ten thousand pounds Sterling."—But the Bishop's munificent patronage of letters did not stop here. He continued to take a fatherly charge of its constitution, and was careful in his selection of the most able officials and professors. The learned and laborious M'Crie has given a minute account of its whole economy, in his biography of Andrew Melville, Napier's contemporary; which account, says he, " is chiefly taken from copies of papers and notes kindly furnished me by Dr Lee, Professor of Church History and Divinity" in the College of St Mary's there. I need offer no apology, therefore, for extracting a little on the subject from such a source. " The University of St Andrews was formed on the model of those of Paris and Bologna. All its members or supports, as they were called, including the students who had attained the degree of bachelor, as well as the masters, were divided into nations, according to the places from which they came. The nations were those of Fife, Angus, Lothian, and Albany; which last included all that did not belong to any of the three former districts. These elected annually, at a congregation or general meeting, four procurators, who had a right to act for them in any cause in which their interests were concerned, and four intrants or electors, by whom the rector was chosen. The rector was chief magistrate, and had authority to judge and pronounce sentence, with the advice and consent of his assessors, in all causes, civil and criminal, relating to members of the university, with the exception of crimes which inferred the highest punishment. He had a right to repledge any member of the university who might be called before any other judge, civil or ecclesiastical. And in certain cases, those who did not belong to the university might be called before the rector's court upon the complaint of a master or student."—" Besides its civil and criminal jurisdiction, the university possessed ecclesiastical powers, in the exercise of which it sometimes proceeded to excommunication. It may be mentioned as an evidence of the respect paid to literature, that, in consequence of a dispute which had arisen, it

was determined that the rector of the university should take precedence of the prior of the abbey in all public processions. For the direction of its literary affairs, the members of the university were divided into Faculties according to the sciences that were taught; at the head of each of these was a dean, who presided at the meetings of the masters of his faculty, for regulating the mode of study, for examinations, and the conferring of degrees." Of the college in which our philosopher was incorporated, the same author gives the following account: "The College of St Salvator consisted of three professors of divinity, called the provost or principal, the licentiate, and the bachelor; four masters of arts, who were also in priests orders; and six poor scholars or clerks, making in all thirteen persons, according to the number of the apostles of our Saviour, in honour of whom the college was named. The provost was bound to read lessons in theology once a-week, the licentiate thrice a-week, and the bachelor every readable day. The first to preach to the people four times, and the second six times a-year. From the four masters of arts two at least were to be annually chosen as regents, the one to teach logic, and the other physics and metaphysics, according to the method of the schools and the statutes of the university. The college was liberally endowed by the founder for the support of the masters and scholars, besides the altarages liberally founded by other individuals. The strictest rules were laid down as to the behaviour of all the members, and as to the religious exercises, as well as the studies of those who were admitted to the benefit of the institution. Young men of rank or opulence who might choose to study in the college, and to pay for their board, were bound to obey the provost, and to submit in all things to the rules of the house equally as the bursars or poor scholars." Without entering into the history of the other colleges, enough has been quoted to show generally the nature of the institution and discipline to which the young philosopher was first committed. It is proper to add, however, in reference to the earliest indications of his mind, that, although the great question was still keenly contested among them, (of which Napier gives an instance in himself and his papistical friend,) "every thing connected with the Roman Catholic faith and worship, which was interwoven with the laws and practice of the university, and of the colleges belonging to it, was removed immediately upon the establishment of the Reformation. Other alterations were at the same time contemplated by the reformers, but various causes prevented them from being carried into effect. Accordingly, the mode of teaching, and

the academical exercises, so far as related to philosophy or the arts, continued nearly on their former footing."

With regard to the classes, " all the scholars who entered at one time into a college formed a class, which was put under the government or tuition of a regent. The regents were different from the professors, who had permanent situations in the college. Originally every master of arts was bound to teach a class, and came under an engagement to this purpose at his laureation. Afterwards it became customary to grant dispensations from this duty."—" The regular time of the course was four years, but it was more usually finished in three years and a-half. The session began on the first of October, and continued through the whole year, except the months of August and September, which were allowed as a vacation."—" In the middle of the third year of their course, such of the students as obtained an attestation of regular attendance and good behaviour from their regent and the principal of their college, were admitted to enter on trials for the degree of bachelor," &c. At the end of the course, the act of laureation passed through a wider field of examination; and " the degree of master of arts was solemnly conferred by the chancellor of the university,—*in nomine patris, filii, et spiritus sancti.*"

The name of our philosopher has never been connected with the University of St Andrews upon an accurate examination of its records. Lord Buchan observes, " the time of Napier's matriculation does not appear from the register of the University of St Andrews, as the books ascend no higher than the beginning of the last century; but as the old Lady of Babylon assumed in the eyes of the people of Scotland her deepest tinge of scarlet about the year 1566, and as that time corresponds to the literary bairnage of John Napier, I suppose he then imbibed the holy fears and commentaries of Maister Christopher Goodman; and, as other great mathematicians have ended, so he began his career with that mysterious book." Thus carelessly, in the only life of him hitherto written, was the fact of the commencement of his studies investigated, and one of their most anxious objects dismissed. I am bound to record, however, that after having travelled to St Andrews to examine the books of its university, I was told the same story of their reaching no higher than a date comparatively modern; but afterwards discovered that the original record was in Edinburgh. It is to be regretted that the able historian of Scottish learning, from whom we have quoted so liberally, had not, in his minute account of St Andrews and its students, cor-

rected the mistake of Lord Buchan. Indeed the fact had nearly been lost, at what seat of learning the greatest man whom Scotland ever produced first received instruction. That Napier himself should have recorded it was the most unlikely mode of its being saved, for no one was less egotistical or more sparing of his words. The accidental notice he has left is not given for the sake of autobiography, further than to account for the progress of that holy spirit which led him to endeavour to make plain the whole revelation of St John. Although the "Life of Andrew Melville" might be entitled a history of the University of St Andrews its students and professors, Napier's name is omitted in this antiquarian research; and when a complimentary mention of him as a mathematician occurs in a subsequent page of the volume, no biographical sketch is attempted, and no suggestion offered as to the place of his education, though his name is more consequential to St Andrews than that of Locke to Oxford, or even Newton's to Cambridge. Fortunately, however, we know the place of his youthful studies from his own account; and of the existence of the books of the college in which the original record of his incorporation stands, I can now assure the reader, having satisfied myself upon that point by ocular inspection.*

Nothing can be more interesting than to trace in the columns of that venerable tome the original entry of his name, whose pre-eminence amid all the learning of St Andrews can be so easily demonstrated. At the usual season of matriculation, he was incorporated in St Salvator's in the year 1563. The record bears that this was the fourteenth rectorship of Master John Douglas, the pro-

* It is a curious fact, that at the University of St Andrews an idea prevails that their records ascend no higher than some time in the 17th century. This must have arisen from that mischievous carelessness about the literary antiquities of the country, of which the tendency is to engender those apocryphal histories which Lord Hailes did so much to eradicate and render disreputable. But a philosophical spirit of antiquities can never pervade the annals of Scotland, if her seats of learning do not catch and cherish the fire.

To the Rev. Dr Lee my best thanks are due for having furnished me with the following accurate note as to these records:—"The Record of the Faculty of Arts begins in 1413, and has been continued without any material interruption; and the Record of Matriculations has been preserved since 1484. What is called the Faculty Quæstor's Book (containing accounts of the fees paid for graduation) begins in 1456, two years prior to the opening of the oldest of the colleges. Every thing which was ever published relating to the University of St Andrews, till within the last twenty years, abounds with errors; and nothing can be more incorrect than the authorized statements inserted in the Statistical Account of Scotland."

vost of the new College of St Mary.* The names of the *incorporati*, "ex collegio Salvatoriano, hoc anno 1563," are registered in the following order: "Johannes Baxtar, Johannes Kar, Gulielmus Malwill, JOHANNES NEAPER, Thomas Ramsay, Gulielmus Ramsay, Walterus Buchquhannane, Bartholomeus Porterfield, Homerus Blair, Marcus Kar, Thomas Anderson, Johannes M'Kalzenie." The names of those who entered the other colleges at the same time will be found in the note at the end of the volume.† Although some learned men may be discovered among the *incorporati* of 1563, certainly there is not one sufficiently illustrious to render any comparison with Napier interesting. Of those who formed the same class with himself the most peculiar name, Homer Blair, affords the only coincidence worth mentioning. He of that ambitious appellation was born in the same year with Napier,—was incorporated in the same year and class,—and became professor of mathematics at St Andrews, in which capacity he died. These facts are gathered from his epitaph as recorded by "Old Mortality."‡ The "Marcus Kar" of the same class as our philosopher was probably he who was created first Earl of Lothian in 1606,—namely, the eldest son of Mark Ker Abbot of Newbottle, and the Lady Helen Lesly. The earliest notice of him in the peerage is, that he had been provided to the reversion of his father's abbacy by Queen Mary in 1567, and was appointed master of requests in 1577. Of the *incorporati* of the other colleges, the name which chiefly attracts the eye is that of Hercules Rollock,

* James Melville (the minister) in his diary to be afterwards noticed, makes frequent mention of the rector. Speaking of the year 1571, he says, "Our haill collage, (St Leonard's) maisters and schollars, war sound and zelus for the guid cause; the uther twa collages nocht sa; for in the new collage (St Mary's,) whombeit Mr Johne Dowglass their rector was guid aneuche, the thrie uther maisters and sum of the regentes war evill myndit."—"The auld college (St Salvator's) was rewlit be Mr Jhon Rutherfurd, then dean of facultie, *a man lernit in philosophie, bot invyus corrupt.* This I mark for the setting furthe of the benefit I receavit in the collage and companie I was into."—*The Diary of Mr James Melville*, 1556–1601.

† See Note C.

‡ "Hic jacet Magister Homerus Blair, Professor Mathematicus Academicæ Andreanæ.—Vir pius, probus, et doctus. Obiit 21 Martii 1603, ætatis suæ 53."—*Monteith's Theater of Mortality*, p. 119. So he had not the satisfaction of living to enjoy the invention of Logarithms by his classfellow. His name is mentioned by the secretary of Knox in conjunction with that of Rutherfurd in the affairs of 1572. "Also the said Mr Jhone Rutherfurde, at what time one of his colledge called Mr Homere Blair hath made orasone invective against St Leonard's Colledge," &c.—*Bannatyne's Journal*, p. 375.

who became distinguished in the same path of fame as George Buchanan, though of an inferior grade. He was a Latin poet and a pedagogue. His muse figures in the "Delitiæ" of Scotland, and his biography has been sketched by Dr M'Crie.* The dignity to which he rose was that of head master of the High School of Edinburgh. His appointment was under the patronage of Napier's uncle the Bishop of Orkney, and I have ventured to ascribe to Rollock the bishop's poetical epitaph, which yet may be read in ancient Holyrood.†

Looking further than the year of our philosopher's incorporation, we see names which certainly reflect lustre upon Scotland; and to say that he is beyond all comparison the finest genius that can be connected with St Andrews in her brightest era, is tantamount to claiming for him the throne of letters in Scotland. At the commencement of the century in which he was born, and prior to the introduction of grammar-schools in Scotland, men of rank, who took any pains with the education of their sons, sent them to board with monks, where they imbibed the scholastic absurdities of the cloister. But it is obvious, from an item in his mother's will, that our philosopher had been boarded within the college, and under the especial charge of the principal. The statement of debts due at her death, which occurred 20th December 1563, bears "item, to Johnne Rutherfurde for hir sonnis burde, auchtene pundis."‡ Rutherfurd was a philosopher in all but his temper, which was violent to a degree: in the very year when Napier matriculated, the principal had been so outrageous as to receive a solemn rebuke from a court of inquiry on the subject. The following spirited sketch of his history, from the pen of Dr M'Crie, renders any other notice of him superfluous. "The scholastic philosophy still maintained its authority, and formed the chief subject of study in the universities. John Rutherfurd was at this time the most celebrated teacher of it in Scotland. He was a native of Jedburgh in Roxburghshire; and, having gone to France, entered the College of Guienne at Bordeaux. There he prosecuted his studies under Nicolaus Gruchius, equally distinguished for his knowledge of the Roman antiquities and his skill

* Life of Andrew Melville.

† See Note B.

‡ James Melville, who went to St Andrews in 1571, says, "I was burdet in the houss of a man of law, a verie guid honest man, Andro Greme be nam, wha lovit me exceiding well, whase wyff also was an of my mothers; I am sure sche haid nocht sone bern sche loved better."—*Diary*, p. 33.

in the Aristotelian philosophy. He appears to have accompanied his teacher and his countryman Buchanan on their literary expedition to Portugal, from which he came to the University of Paris. His reputation reached Archbishop Hamilton, who invited him home to occupy a chair in the College of St Mary, which he had recently organized at St Andrews; and, after teaching it for some years as Professor of Humanity, Rutherfurd was translated to be principal of St Salvator's College in the same university. In such estimation was he held, that, soon after his admission into the university, he was raised to the honourable situation of Dean of the Faculty of Arts, though not qualified for holding it according to the strict import of the statutes. He had embraced the reformed doctrines before their establishment in Scotland, and was declared qualified for "ministering and teaching" by the first General Assembly. By the authority of a subsequent assembly he was admitted minister of Cults, a parish in the neighbourhood of St Andrews, of which the principals of St Salvator's were, by the foundation of that college, constituted rectors. It was also part of his duty as principal to lecture on theology. But Rutherfurd was more celebrated as a philosopher than a divine. Considered in the former character, his labours were unquestionably of benefit to the university and the nation. The publication of his treatise on the art of reasoning may be considered as marking a stage in the progress of philosophy in Scotland. It is formed, indeed, strictly upon Aristotelian principles, of which he was a great admirer, but still it differs widely from the systems which had long maintained an exclusive place in the schools. Treading on the steps of his master De Gruchi, Rutherfurd rejected the errors into which the ancient commentators upon Aristotle had fallen, and discarded many of the frivolous questions which the modern dialectitians took so much delight in discussing. His work contains a perspicuous view of that branch of the peripatetico philosophy of which it professes to treat. He had caught a portion of the classical spirit of the age; and the simplicity and comparative purity of his Latin style exhibit a striking contrast to the barbarous and unintelligible jargon which had become hereditary in the tribe of schoolmen and sophists. It appears from a curious document, that Rutherfurd, like some other philosophers, did not always display his philosophy in the management of his temper. In consequence of complaints against him by his colleagues, a visitation of the College of St Salvator took place in 1563, when it was found that the principal had shown himself 'too hasty and impatient,' and he was admonished 'not to let the sun go down

upon his wrath, and to study to bridle his tongue, and conduct himself with greater humility and mildness.' " * Thus Napier's mind was awakened to theology by Goodman, and he first caught the spirit of philosophy, but without the alloy of passion, from the ardent soul of the pupil of De Gruchi, from whom also he may have acquired the simplicity and purity of his Latin style, in which our philosopher even excelled his master. There is no question that he as far excelled him in mathematics as he did Goodman in recondite theology.

Several of Napier's contemporaries who had studied at St Andrews in their youth, and who were well known to him in after life, became no less prominent in the public affairs of the country, than they were distinguished in letters. Among these was Sir John Skene of Currie Hill, the clerk-register, to whom we owe the first collection of the Scottish Acts of Parliament, the treatise de Verborum Significatione, the Regiam Majestatem, and the Quoniam Attachiamenta. He studied first at the King's College of Old Aberdeen, but took his degree of master of arts at St Andrews, where he taught as a regent in the years 1564 and 1565, that is, during the short period that Napier was there. He became well known and distinguished as an officer of state and a diplomatist. Lord Hailes notes this critique of him in his catalogue of the Lords of Session. " It were to be wished that his knowledge of Scottish antiquities had been equal to his industry." Upon one occasion, however, he supplied his own defects in a way that, had he always followed it, would have left Lord Hailes nothing to say against him. In the course of preparing the treatise de Verborum Significatione, he came to the word " particata vel perticata terræ," which he defines " from the French word perche; meikle used in the English lawes, ane ruid of land." He then adds, " But it is necessare that the measurers of land called landimers, in Latin agrimensores, observe and keep ane just relation betwixt the length and the breadth of the measures quhilk they use in measuring of lands, quhairanent I find na mention in the lawes and register of this realme, albeit ane ordinance thereanent be maid to King Edward the First, king of England, the 33d yeir of his reigne; and because the knawledge of this matter is very necessare in measuring of lands dayly used in this realme, I thought gud to propone certaine questions to John Naper fear of Merchistoun, ane gentleman of singular judgement and learning, especially in the mathematique sciences; the tenour quhairof, and his

* Life of Andrew Melville.

answeres maide thereto, followis," &c.* As this treatise was published in 1597, (seventeen years before the publication of the Logarithms,) Napier's fame must have been long established with those who knew him; and there can be no doubt that Skene regarded him with a veneration that was founded on his knowledge of him from youth upwards.

Sir Thomas Craig of Riccarton, his father's colleague in office, may nevertheless be considered Napier's contemporary. Indeed, if we are to rely upon the account of his biographer Baillie,† who says that he was born in 1548, he was just two years older than the philosopher. But in the more recent life of Craig compiled by Mr Tytler, it is suggested, with great plausibility, that the above date ought to be read 1538, which is consistent with the rest of his career. He certainly was incorporated as a student of St Leonards in 1552, eleven years before Napier became a student of St Salvator's, and probably this was about the difference betwixt their ages. Craig continued at St Andrews long enough to take his place among the *determinantes* or bachelors, but not the degree of master of arts, having set out to complete his education at the far-famed university of Paris, somewhere about the year 1555.‡ He returned a few years afterwards, and brought his natural and acquired capabilities to profitable account at the then rising bar of Scotland. Mr Tytler observes, "in the year 1564, Craig, after having been for a very short time at the bar, was promoted to a situation of importance and responsibility. This was the office of justice-dupute." But it appears from the records of justiciary, which we have elsewhere quoted, that he obtained this office even sooner than is here supposed, and sat for the first time on the 6th July 1563, the year that Napier entered St Salvator's. He acquired the reputation of one of the first classical scholars of his country and times. Baillie says of him, that in elegant literature he surpassed all his contemporaries; and Burnet,§ that he had no rival in Greek and Latin, and spent his life among his books. Biographical eulogies are about as trustworthy as those of an obituary, unless there be some unequivocal fruits of the genius that is lauded. The beautiful treatise De Feudis, the first philo-

* See Note D for Napier's answers.

† "De D. Thomæ Cragii Vita," &c. prefixed to the last edition of the treatise de Feudis.

‡ See Mr Tytler's Life of Craig, 1823.

§ Burneti, Præfatio.

sophical work on law which our country produced, may still be proudly appealed to in the history of letters, and is that which sustains the fame of its author Sir Thomas Craig. That the work is in some respects faulty and calculated to mislead the student of our laws, has been asserted; though it is never pretended that these errors destroy its character as a great national work, worthy of a philosophical subject and of a philosophical country. When we add that Craig was no mean Latin poet in the age of Buchanan, his claims are exhausted; but they are sufficient to place him among the most distinguished in the annals of his country's learning. Yet after all he can only stand such a comparison with the Inventor of Logarithms, as Blackstone with Sir Isaac Newton. Napier, we shall find, acquired the same command of languages, and was not unvisited by the muses; but he demonstrated the far superior grasp of his intellect in a manner that renders all critical comparison useless. Sir Thomas's second son was an intimate friend of Napier, and apparently the first person to whom he revealed the fact that he had conceived the Logarithms. This was Dr John Craig, the physician of James VI., a more particular notice of whom, with the interesting anecdote alluded to, belongs to another chapter of these memoirs. From the circumstance of the fathers being colleagues in office, and the sons confidants in science, it may be assumed that a great intimacy subsisted betwixt the Napiers of Merchiston and the Craigs of Riccarton. It is singular that the parents of one so distinguished as our feudist should only have been ascertained the other day. Baillie, without citing any authority, had said that he was the son of Mr Robert Craig, a merchant in Edinburgh. Tytler, upon very slender presumptive evidence, decides that he was "the eldest son, not of Mr Robert Craig, but of Mr William Craig of Craigfintray." Neither of these biographers attempted a suggestion even, as to the name of his mother. Mr Riddell, an able antiquarian lawyer, settled this question only last year. In a compilation replete with facts, but the title of which holds out little promise of this one,* he discloses the marriage-contract of the feudist himself, dated last day of October 1573, in which he is expressly called the son of Robert Craig, burgess of Edinburgh, and Katharine Ballandine, his spouse. Having thus discovered the father and mother of Sir Thomas Craig, this writer adds, "and there can be little doubt that Katherine Bellen-

* "Remarks upon Scotch Peerage Law, as connected with certain points in the late case of the Earldom of Devon, to which are added desultory observations upon the nature and descent of Scotch Peerages, &c. &c. by John Riddell, Esq. Advocate." 1833.—*Appendix, No. IV.*

den, his mother, was of the distinguished and powerful family of the Bellendens of Auchinoul and Broughtown, who were raised to the peerage at the restoration."* Mr Riddell was scarcely aware of the genealogical surprise involved in this theory. If true, there would be no doubt who the lady was. She must have been that sister of Sir Thomas Bellenden, and aunt of the justice-clerk, in whom we have already detected the mother of the Bishop of Orkney and Janet Bothwell. In other words, the *grandmother* of John Napier of Merchiston was the *mother* of Sir Thomas Craig of Riccarton. We would then have to add this to the marvel, that the names of these near relations of two such great contemporaries had been lost till within the last twelvemonth,—had been recovered about the same period, by researches totally separate and independent, but which eventually disclosed the same lady for both. Such a fact would be considered of great value in genealogical researches; and in hopes of being able to establish it we have traced Katherine Bellenden of Auchinoul through all her marriages; but regret to say that Robert Craig is not one who can claim the honour of having been her spouse. That lady had her arms full enough already. She was successively the wife of Francis Bothwell, Adam Hoppar, and Oliver Sinclair; and it was during her marriage to the latter that Sir Thomas Craig must have been born. †

* Mr Riddell founds this upon the plausible fact, that Sir John Bellenden, in his will, styles Mr Thomas Craig, advocate, "*cousing*," and makes him, along with other relatives, one of the tutors to his children. No other Katherine Bellenden of Auchinoul is given by the peerage writers, except the lady whom we have elsewhere proved to have been the maternal grandmother of Napier. If Craig's mother was of Auchinoul, she could have been none other than this same lady. She could not have been *a daughter* of Sir Thomas Bellenden, as that would have made Craig Sir John's nephew. But she may have been a *natural* sister of the other Katherine Bellenden, which would explain the expression in Sir John's will.

† *Note B.*—But we cannot leave the feudist in this doubtful position; and if we fully solve the problem of his parentage, this genealogical digression, it is hoped, will be pardoned. The high treasurer's accounts in the reign of James V. and of date 25th March 1539, bear;—"*item*, send to Linlithgow be Katheryne Bellendene to the quenis grace, twa pound of sewing gold; *item*, ane pound of sewing silver; *item*, ix unce of blak Paryse silk," &c. Many items of the same sort, with their various prices, follow, which prove that, besides the wife of the king's minion, (Napier's grandmother,) there was a female of the same name about court in the quality of an embroideress. In the following year, 10th May 1540, there is;—*item*, deliverit to Katherine Belendene, till complet *ane sark* to the kingis grace, sewit with gold and silver wark, half ane doubill hank of sewing gold." Upon the 11th of January of the very next year we find, "*item*, to *Robert Crag*, for ane collar of gold sett with perle, brocht hame be him to the quenis grace, and for bonettis, swerd-

We have now to name the man whom contemporary eulogists were most apt to select as a *pendant* to Napier; and that is the popular Buchanan, who became principal of St Leonard's College in 1567. "The intellectual endowments of George Buchanan," says Dr Irving, "reflect the highest splendour on the land of his nativity; and every scholar who derives his origin from the same country is bound to cherish and revere his memory."—"The history of Buchanan is the history of an individual unrivalled in modern times." * There is some exaggeration in this estimate. It is what may be said of Napier, but not of Buchanan. He ranks high in the learning of his country; but to render the praise of his biographer not hyperbolical, the heart of Buchanan ought to have been purer, and his head more profound. Blackwood says of him with great truth, that he was "homme ingrat, et desloyal;" and when we examine his conduct and his writings in reference to the history of Queen Mary, with the aid of those proofs which have been collected within these few years to illustrate that unhappy page of our history, no impartial mind can come to any other conclusion, than that Buchanan was a rogue. His admirers have claimed for him an *apotheosis* with the eloquent and elegant Livy; but he may find himself—under the fiat of eternal justice,—nearer the reprobate Sallust. In popular estimation his name is much more identified with the erudition of his country than Napier's. Our philosopher has acquired with the vulgar the equivocal status in letters of a warlock; but there are men in our own times of considerable literary attainments, who will afford him no higher praise than the sneer of Iago "forsooth a great arithmetician."—"Napier," says an author of historical celebrity, "has much merit, but cannot stand in the rank of great inventors. He is only an useful abbreviator of a particular branch of the mathematics." † Sir David Brewster (or the writer he employed) ransack-

beltes, *sewing-silk*, and uther gear," &c. Here (for the first time reunited in modern days) are the parents of Napier's friend and contemporary Sir Thomas Craig of Riccarton. The silken bonds that drew them together are manifest. In the same royal accounts there is an *item* 18th July 1537, "to *Thomas* Crag fyve elne Paris blak, to be the kingis grace ane ryding goune with ane hude." This was probably the feudist's *grandfather*, after whom he was called.

* Life of Buchanan, by Dr David Irving.

† *See Pinkerton's "Inquiry into the History of Scotland preceding the reign of Malcolm III."* He there reads a solemn lecture to the Scottish nation upon that "fervidum ingenium," that "impatience of thought and labour," from which, he conceives, Scotland has never been redeemed by a single instance. "In literature and philosophy," says he, "the same impatience prevails, and the consequence is, that we have not only never produced any man of erudition, but we have also had

ed his memory to record the names of those whose literary achievements illustrate Scotland, and forgot, only John Napier. But had he omitted the name of *George Buchanan*, the very printers' devils would have mobbed the disciple of Newton on the streets of Modern Athens. *

The purest pedestal of Buchanan's fame is his Latin poetry. Thus it is not difficult to determine the respective grades in letters, of James' pedagogue and Scotland's philosopher. We shall show that Napier surpassed Archimedes in logistic, and emulated him in mechanics. Does Buchanan rival Horace in rhyme? This test of their comparative literary merits is well illustrated by the commendatory verses attached to Napier's Canon Mirificus, by his friend Andrew Young, professor of philosophy in the University of Edinburgh:

BUCHANANE tibi NEPERUM adscisce sodalem
Floreat et nostris, Scotia nostra viris:
Nam velut ad summum culmen perducta *poesis*
In te stat, nec quò progrediatur habet;
Sic etiam ad summum est culmen, perducta *mathesis*
Inque hoc stat, nec quo progrediatur habet.

The distinction of their moral characters is yet more marked; being that betwixt an unprincipled partisan, and a Christian philosopher. While the learned in our own times labour to give us fanciful portraits of Buchanan, we have one of him drawn from the life by Napier's relative Sir James Melville, upon every line of whose simple portraiture the stamp of truth is impressed. "Bot mester George was a stoik philosopher, and loked not far before the hand; a man of notable qualites for his learnyng and knawledge in Latin poesie, mekle maid accompt of in other contrees, plaisant in company, rehersing at all occa-

no INVENTOR,—no man who opened up a new path in science. We cannot boast, like Denmark, of a Tycho Brahe, nor, like Sweden, of Linnæus, nor, like Poland, of a Copernicus. By the same impatience of thought and labour, our writers of every class, though often ingenious and elegant in a supreme degree, have never yet attained the character of great or sublime. We have no Bacon —no Newton—no Shakespeare—no Milton. These remarks are given not to upbraid, but to admonish and to serve."

* *See Brewster's Edinburgh Encyclopædia, article* SCOTLAND. A chapter on the literature of Scotland is there given, in which every Scotchman of literary fame down to modern days (and particularly mathematicians) are specially enumerated, except Napier. The two striking events in our literary annals particularized are the poems of Ossian and the novels of Sir Walter Scott; but the invention of Logarithms is passed in silence.

sions moralities schort and fecfull, whereof he had aboundance, and invented wher he wanted. He was also of gud religion *for a poet*; bot he was easely abused, and sa facill that he wes led with any company that he hanted for the tym, quhilk maid him factious in his auld dayes; for he spak and wret as they that wer about him for the tym infourmed him. For he was becom sleperie and cairles, and folowed in many thingis the vulgair oppinion; for he was naturally populaire, and extrem vengeable against any man that had offendit him, quhilk was his gretest falt." * Other cousins of our philosopher were in daily converse with Buchanan. The Lady Mar and her brother Tullibardine had the especial charge of King James in his youth, At this time, says Melville, the king "had for principall preceptouris, Mester George of Buchwennen, and Mester Peter Young," &c. † "My Lady Mar was wyse and schairp, and held the king in great awe; and sa did Mester George Buchwhennen." Thus the family of Merchiston must have been well known to James' pedagogue, though probably the contrariety of their habits, moral and intellectual, kept him and the philosopher always separate.

Another *alumnus* of St Andrews, belonging to the era of learning which Napier consummated, was Robert Pont, his intimate friend, and a man of a much superior stamp to Buchanan, though not of such popular celebrity. He was obscurely born at Culross in the year 1529, his name being properly Kynpont. It seems that he was only incorporated as a student in St Leonard's College of St Andrews nine years before Napier came to the University. ‡ He soon became distinguished among the pastors of the reformed church,—was one of the most efficient leaders of the General Assembly during times of the greatest difficulty,—regulated their affairs with the most practical zeal and prudence, and yet was a master in the deepest speculations of theology. "In 1563, he competed with Alexander Bishop of Galloway for the office of superintendent of that diocese; but it does not appear that he obtained it, though he was shortly after appointed commissioner of the diocese of Moray. In 1566, his translation and interpretation of the Helvetian Confession were ordered to be printed by the General Assembly; and, in March 1569, they petitioned the regent that the kirk, without offence to his majesty, might appoint him to a situation of greater usefulness; and he was, in consequence, presented to the

* Memoirs, p. 262. † P. 261. ‡ Tytler's Life of Craig.

provostry of Trinity College, and afterwards to St Cuthbert's Church. In this year, also, he executed the commands of the General Assembly in excommunicating *Adam Bishop of Orkney*, who married Bothwell and Mary." * But he was equally fitted for secular employments. In 1571, at the request of the Regent Mar, the convention at Leith, taking into consideration his super-eminent knowledge of the laws, made a special exception in his favour, allowing him to accept the place of a Senator of the College of Justice; and when, in opposition to the proposal of Morton, the Assembly "vottit throughout, that naine was able nor apt to bear the saides twa charges," Pont was again excepted. He was, moreover, a profound mathematician; and altogether the cast of his mind more nearly approached that of our philosopher than any other scholar whom St Andrews produced. When we add, that for upwards of thirty years they lived close to each other, united in the cause of the church and in their common studies of theology and science, and holding during all that time the reciprocal relation of principal heritor and parish priest, it is not to be wondered at that Pont should quote frequently in his abstruse lucubrations, "that faithful servant of Christ, my honored and *surpassingly learned* friend John Napier." †

If we consider how Napier's life was consumed, it ceases to be a subject of regret that we must derive our knowledge of what was passing around him,—of the scenes in which his youth was trained, and the state of education and society that may be supposed to have in some measure influenced the progress of his mind,—from his contemporaries and not from himself. Fortunately, while his cousin, Sir James Melville, has bequeathed to posterity that original manuscript of political and courtly memoirs already referred to; another James Melville, his contemporary, has left a diary (to which we have already referred) of his own life, and church affairs in Scotland, still more minute in its details, though less varied and interesting. The latter journalist was a Scotch clergyman, and the nephew of that celebrated moderator of the church, Andrew Melville, whose life has been so ably compiled by Dr M'Crie. ‡ James

* Messrs Brunton and Haig's History of the Lords of Session.

† "Et apud honoratum et apprimè eruditum amicum nostrum fidelem Christi servum Joannem Naperum, cujus extant in Apocalypsin ὑπομνήματα."—*De Sabbaticorum annorum periodis*, &c. 1619. We shall afterwards have to notice Pont's works more particularly.

‡ The *Memoirs* of Sir James Melville must be distinguished from the *Diary* of James Mel-

Melville, the minister, (with whom we shall find our philosopher associated on a most critical mission of the church to James VI.) entered in 1571 the same university that claims the honour of Napier's earliest public instruction. From his quaint diary we may extract a passage, containing a curious and interesting account of St Andrews and its tuition a few years after Napier left it, and before it had undergone any revolution in habits or system. Speaking of his regent, William Collace, he says, "So I cam to St Andros about the first of November, in the forsaid yeir 1571, and enterit in the course of philosophie, under the regenterie of the said Mr Wilyeam, wha haid the estimation of the maist solide and lernit in Aristotle's philosophie. And first hard under him Cassander his rhetorik; but at the beginning, nather being weill groundet in grammer, nor com to the years of naturall judgement and understanding, I was cast in sic a greiff and dispear becaus I understood nocht the regent's language in teatching, that I did nathing bot bursted and grat at his lessones, and was of mind to haiff gone ham agean, war nocht the luiffiing cear of that man comforted me, and tuik me in his awn chalmer, causit me ly with himselff, and everie night teached me in privat, till I was acquented with the mater. We hard the oration pro rege Deistaro. Then he gaiff us a compend of his awin of philosophi, and the partes thairof, of dialectik, of definition, of division, of enunciation, and of a syllogisme enthymen, and induction, &c. quhilk I thought I understood better. About the quhilk tyme, my father, coming to the town, begonde to examine me, and finding sum beginning, was exceidinglie rejoysit, and uttered sweittar affection to me than ever before. He enterteined my regent verie hartlie in his ludging, and gaiff him grait thanks; he send me to him, efter he haid taken leive, with twa pieces of gold in a neapkine; bot the gentleman was sa honest and loving, that he wald haiff non of his gold, but with austere countenance send me bak with it: Na, never wald receave gold nor silver all the tyme of my course. We enterit in the Organ of Aristotle's Logics that yeir, and lernt till the Demonstrations. He haid a lytle boy that servit him in his chamber, callit David Elistone, wha, amangs threttie and sax schollars in number, (sa manie war we in the class) was the best. This boy he causit weat on me, and confer with me, whase ingyne and judgement past me als far in the wholl course

ville, which is also beautifully printed for the Bannatyne Club. There is some idea that the minister belonged to a family derived from an early cadet of Raith, but the genealogical proofs are not sufficient.

of philosophie, as the aigle the howlet. In the multiplication of propositiones, medalles, coversion of syllogismes, pons asinorum, &c., he was als read as I was in telling an-and-threttie." * It seems thus to have been Melville's fate, both in boyhood and maturer years, to meet an associate who, in philosophy and mathematics, surpassed him as " the aigle the howlet."

The first book of discipline, one of the committee appointed to revise which was Napier's uncle the Bishop of Orkney, had paid particular attention to the subject of education, and contained a chapter for remodelling the schools and universities. This book of discipline fell to the ground; and, in the year 1563, (that of Napier's matriculation,) a petition was presented to Queen Mary and the Lords of the Articles, " In the name of all that within this realm ar desyrous that leirning and letteris floreis;" and praying for a statutory remedy against the decay of funds, and the decline of learning and good tuition at St Andrews. George Buchanan was one of the commissioners appointed by Parliament to visit and report.† The distracted state of the country, however, prevented any effectual reform until the year 1579. It is not surprising, therefore, that John Napier, whose precocious talent and gentle dispositions must have been observed and appreciated, cannot be traced in the college records beyond his matriculation.

The names of those who had the honour of teaching our philosopher in the quality of regents will be found in a note at the end of the volume;‡ from which also it will be seen that he had not remained long enough at St Andrews to become a regent himself. The names, with a few exceptions, of all his class-fellows can be traced as becoming, at the stated periods, bachelors and masters of arts. That of John Napier, however, is not among them; and the necessary inference is, that no more than the ground-work of his education had been laid at that university. Had he remained at St Andrews according to the discipline of his college, and the contemporary instances, his name would appear in the list of *determinantes* for the year 1566, and of masters of arts for 1568.

There were several causes which may have induced his father to shorten the time of the young philosopher's studies in Scotland: The violent temper

* Diary, p. 20.

† Acts of the Scotch Parl. ii. 544.

‡ Note C.

of the principal; the fact that John Napier, according to his own account, had there "contracted a loving familiaritie with a certaine gentleman, a Papist;" the unsettled state of the country and the university; and, finally, because some exceptions had about this time been taken to the internal state of the colleges, which occasioned a Parliamentary inquiry.

Nor can it be doubted that he finished his education at a foreign university. Crawfurd the peerage writer, who lived in the same century in which Napier died, and who tells us that he obtained much of his information through the liberality of the noble families he records, states that Napier, "being a man of great natural parts, took care to improve them by a good education in the schools of learning, first at home, and then by travelling abroad into foreign parts, where he spent some years." * This obviously is just a mode of stating that he obtained the usual advantages of a good education in those days. It was the invariable practice for all who had the slightest pretensions to become learned, to follow out a few years of study at home in a foreign university. Such we know to have been the case with every contemporary of Napier who distinguished himself; and it would be most remarkable if he who was pre-eminent among them, and to whom the wealth of his family rendered the advantage one of easy attainment, had remained at home. His excellence in the science of theology, and his thorough command of languages, no less than his philosophical powers, clearly indicate the most recondite education which the times could afford. It must be remarked, too, that the Bishop of Orkney advised that his nephew should be sent abroad; and about the period when his name disappears from among those of his fellow entrants of St Salvator, the university of Paris enjoyed its highest reputation and greatest security. Andrew Melville, who was Napier's senior by five years, after studying in St Mary's College of St

* Peerage. *Napier.*—"Crawfurd, the peerage writer, although not the most acute or accurate of men, yet far honester than Douglas."—*Remarks upon Scotch Peerage Law, &c. by John Riddell, Esq.*

There is a short account of John Napier and his works by Dr Mackenzie in his Lives and Characters of Eminent Scotchmen. Mackenzie was a contemporary of Crawfurd the peerage writer, whom he calls "my good friend and learned antiquary." He thus speaks of Napier's travels: "Our author had no sooner finished his studies in philosophy at St Andrews, but he was sent to his travels by his parent; and, having stayed for some years in the Low Countries, *France* and *Italy*, he returned to his native country, and applied himself closely to the study of the mathematics, in which he excelled all the mathematicians of his age."

Andrews, set out for France in the autumn of 1564, and became a student at Paris. "The university then had," says his accurate biographer, "long enjoyed a pre-eminent reputation among the great schools of Europe, founded on its antiquity, the number of its colleges, the extent of its revenues, and the venerated names which stood enrolled on its registers, as professors or as students. Attracted by these considerations, a multitude of young men from all the surrounding countries flocked to it annually, and were admitted citizens of one or other of the four nations into which that learned corporation was divided. The four nations were France, Piccardy, Normandy, and Germany, or England, which last included Scotland and Ireland." *

There were other foreign universities in great repute at this period, but chiefly distinguished for their chairs of law; a study which Napier did not pursue. The person whom Sir Archibald was most likely to consult on the subject of his son's education, was his colleague in office Craig; and he may have also consulted that arbiter literarum in Scotland, Buchanan. Now of these, Craig had lately returned from finishing his own studies in Paris; and the other had even taught in that illustrious seminary.

If the theory of his travels be correct, Napier quitted Scotland for the University of Paris very nearly at the same time as Andrew Melville; and from the diary of Andrew's nephew, we learn some interesting particulars as to the state of public instruction at Paris. In the autumn of the year 1564, his uncle, says he, "ending his course of philosophie, left the University of St Andros with the commendation of the best philosopher, poet, and Grecian, of anie young maister in the land; and with all possible diligence maid his preparation, and past to France. Be the way he was extreamlie tormented with sie seiknes and storme of wather, sa that oft tymes, whylls be danger of shipwrak, whylls be infirmitie and seiknes, he luiked for deathe. He arryvit first in England, and again imbarking, came to Burdeaux, wher he taried nocht lang, bot imbarking from that, came to Deipe; from that to Paris, whar he remeanit in the Universitie twa yeirs at his awin studies, heiring the lightes of the maist scyning age in all guid lettres, the king's publict professors, Andreas Tornebus in Greik and Latine humanitie; Petrus Ramus in philosophie and eloquence;

* M'Crie's Life of Melville, i. 18.

Jo. Mercerus in the Hebrew language, whereupon he was speciallie sett. In the last yeir of they twa he grew sa expert in the Greik, that he declamit and teachit lessones, uttering never a word but Greik with sic readiness and plentie as was mervolus to the heirars. From Paris he past to Poicteors, whar he regented in the Collage of St Marceun thrie yeirs. Ther he haid the best lawers, and studeit sa mikle therof as might serve for his purpose, quhilk was Theologie, wherto he was dedicat from his mother's wombe."* It seems most likely that the shining lights enumerated by James Melville were the very men under whose instructions Napier's mind expanded. "Mercerus and Quinquarboreus," says Dr M'Crie, "were conjunct royal professors of Hebrew and Chaldee. By his oral instructions, the elementary treatises which he published, and his translations from Hebrew and Chaldee, the former contributed more than any individual of that age to the advancement of eastern learning. His commentaries on the Old Testament still deserve the attention of the biblical student; and Father Simon, whose judgment was sufficiently fastidious, has pronounced the highest eulogium on him, when he says, that Mercier possessed all the qualifications of an interpreter of Scripture, and that the only thing to be regretted in him is, that he suffered himself to be carried away by the novel opinions of the reformers. Quinquarboreus, though destitute of the critical acumen and extensive knowledge of his colleague, has shown that he was well acquainted with the Hebrew language." †

The doctrines of the Hugonots or Protestants had made a decided progress in the University of Paris when Napier left St Andrews. Many of the professors and heads of colleges were well known to have embraced the heresy, and scarcely one among them was exempt from suspicion; a fact which affords another strong presumption that Napier was sent there, being about the very period when his father was presiding in the criminal tribunal of reformed Scotland against such delinquents as the Archbishop of St Andrews, and others, for "makand alteratioun and innovatioun in the state of religion;" and when his uncle was revising the first Book of Discipline. But, after the year 1567 a storm burst over this great seminary, and spread through the continent with a desolating fury, the remembrance of which may have often

* *Diary*, p. 31.—Melville adds in a note, "Salinacus, Pascasius, Forcatellus, mathematiciens; Balduinus the lawyer; Duretus, medicine; Carpentarius, Quinquarboreus, hebrew."

† Life of Andrew Melville, p. 31.

crossed the lucubrations of our philosopher in the quiet and studious decline of his life at Merchiston. In that year the second civil war betwixt the Protestants and Catholics broke out; and very soon afterwards, all those professors who refused to subscribe the Catholic faith were forced to fly from Paris. Of these the most celebrated was Petrus Ramus. During the interval of repose and security which had previously visited the University of Paris, that celebrated philosopher there enjoyed himself in his successful hostility to the tottering throne of Aristotle, and in his ardent devotion to philosophy and the sciences, as royal professor of Roman eloquence, and principal of the College of Presle. But what he chiefly laboured to advance, during this oasis of a life of persecutions, was the study of mathematics. The royal library of Fountainbleau had nursed his ardour for geometry and astronomy to a most enthusiastic height, and he made himself a mortal enemy in his great rival Carpentarius, by slighting the mathematical attainments of that eminent philosopher, who was elected royal professor of mathematics at Paris in 1565. Ramus opposed his admission upon the ground of incapacity to teach, and for this contemptuous rivalry is said to have afterwards paid the forfeit of his life. From one or both of these illustrious men, Napier in all probability had imbibed some of that ardent desire for the progress of the mathematical sciences, which induced him in his latter days to toil for those whom he affectionately addresses as " charissimi mathematum cultores." The fate of Petrus Ramus could not fail to affect him. That martyr to science and Catholic fury returned to Paris in the year 1571, and fell a victim at the memorable massacre of St Bartholomew, which occurred in the following year.* De Thou has recorded his fate, and says that the murder was perpetrated by the scholars of his rival Carpentarius.

If Napier encountered perils abroad, he certainly escaped one of a deadly nature at home. In the year 1568, (exactly a century before Newton was driven from Cambridge by the plague which then ravaged England,) a most fearful infliction of pestilence broke out in Edinburgh. The courts of justice were closed, the General Assembly of the Church postponed, and the very literature of the country threatened with annihilation.† Sir Archibald Napier

* Bayle, Art. Ramus. See also *Bulæus, Historia Universitatis Parisiensis*, Tom. vi.

† " Nota.—Fra the hinderend of August 1568, to the secund day of March in the samin year, na

and his family were much exposed to the contagion, by the vicinity of his mansion to the "Borough Muir" of the city, upon which waste the poorer class of those infected were driven out to grovel and die under the very walls of Merchiston. At this very time Sir Archibald was not suffered to quit the Lothians. Mary's defeat at Langside had just occurred, and the regency of her brother was securing the fruits of victory by a rigorous surveillance of the baronial strongholds, and the conduct and affections of their proprietors, throughout the whole country. All Protestant as he was, and although even his cousins Tullibardine and Grange had been in arms upon this occasion against the fugitive queen, it is not surprising that Merchiston, whose immediate predecessors had fallen successively under her father's standard and her own, should have evinced some affection for the persecuted, and only legitimate child of James V. That this was the case is proved by the bond quoted below,*

dyettes of justiciarie halden be ressoun of the pest and Regentis being in England."—*Justiciary Records, MS. Advocates' Library.*

It was in the midst of this fearful devastation that the celebrated George Bannatyne collected the poetry of Scotland. His patriotic industry has obtained a grateful commemoration, and an illustrious monument, from the institution of the "Bannatyne Club," and the compilation of his memoirs by its first president, Sir Walter Scott. I have seen a curious pamphlet entitled, "Ane breve descriptioun of the Pest, quairin the causis, signis, and sum speciall preservatioun and cure thairof ar contenit, set furth be Maister Gilbert Skeyne, Doctoure in Medicine, imprentit at Edinburgh be Robert Lekpreok, 1568." The Doctor strongly advises to take "conseill" of "weil lernit phisicians, for" says he, "in this pestilenciall diseis, everie ane is mair blind nor the moudeuart in sic thingis as concernis thair awin helth, and besyde that, everie ane is becum sa detestable to uther, (quhilk is to be lamentit,) and speciallie the pure in sicht of the riche, as gif they var not equall with thame twichand thair creatioun, but rather without saule or spirite, as beistis degenerat fra mankynd."

* "Apud Edinburgh, 12 Augusti anno 1568. The quhilk day Johnne Cunynghame of Drumquhassill become sourtie for Archibald Naper of Marchamstoun, that he sall remane in ward within the burgh of Edinburgh, and twa mylis about the samyn, and als sall compeir befoir my Lord Regent and Lordis of Secreit Counsale, to answer to sic thingis as sal be inquirit of him at his cuming, as he sal be requirit on sex houris warning, owther personalie, or at his hous of Marchamstoun, under the pane of twa thowsand pundis, and the said Archibald obleist him to releif the said Johnne of the samyn."—*Original Privy-Council Record, Register House.*

Many other barons occur in the same record as becoming bound in the same manner, but the usual security is only one thousand pounds. It also appears that both the brother and cousin-german of Merchiston's Lady (the philosopher's mother) were members of this privy-council. The sederunt marked on the occasion of issuing a charge against the Bishop of St Andrews, in June previous to the above, are "Jacobus Doms. Regens. Jacobus Comes de Morton. Patricius Doms.

the terms of which compelled Merchiston to remain a prisoner in Edinburgh, or within two miles of it, under heavy securities. When the plague broke out, he appears to have petitioned the privy-council of the regent for some relaxation, which had been refused in the most peremptory manner, although his brother-in-law, the Bishop of Orkney, was one of that council, and apparently anxious to befriend him. The following letter, than which a more curious and interesting remnant of the kind could scarcely be produced, was written in consequence by the prelate to our philosopher's father:—

" To the Richt Honorabill and our weilbelovit Bruther the Laird off Merchanstoun.

" Richt Honorabill Schir and Bruther,—I haird the day the rigorous answer and refuis that ye gat, quhairof I wes not wele apayit;* bot alwayis I pray you, as ye ar sett amiddis betwix twa grete inconvenientis, travell to eschew thame baith; the ane is maist evident, to wit, the remaining in your awin place quhair ye ar; for, be the nummer of seik folk that gais out of the toun, the muir is abill to be ovirspred, and it can not be bot throw the nearness of your place, and the indigence of thame that ar put out,† thai sall continewallie repair aboutte your roume, and throu thair conversatioun, infect sum of your servandis, quhairby thai sall precipitat yourself and your children‡ in maist extreme danger; and, as I se, ye hef foirsene the same for the young folk, quhais bluid is in maist perrell to be infectit first, and therefoir purposis to send thame away to Menteith, quhair I wald wiss at God that ye war yourself, without offence of authoritie, or of your band, sua that your houss gat na skaith. Bot yit, Schir, thair is ane midway quhilk ye suld not omit, quhilk is to withdraw you fra that syid of the toun to sum houss upon the north syid of the samin, quairof ye may hef in borrowing§ quhen ye sall hef to do, to wit, the

Lindesay. *Epis. Orchaden.* Commend. Dumfermling," &c. " *Clericus Justiciarie.*" These composed the cabal against Queen Mary.

* This word is not to be found in Jamieson.

† " That with all diligence possible, sa sone as ony hous sall be infectit, the haill houshold, with thair gudds, be despescit towert the mure, the deid buriet, and, with like diligence, the hous clenzit."—" That na maner of persoun pass to the mure for vesiting of thair friends thair, quhill eleven hours before none, in companie with the officar appoyntit for that day, under the pane of deid."—*Town-Council Register*, 1568. This is a different record from the Protocol Books.

‡ Francis and Jane, who were both very young.

§ Sic.

Gray-Cruik, Innerlethis self, Weirdie, or sic uther placis as ye culd chose within ane myle; quhairinto I wald suppois ye wald be in les danger than in Merchanstoun: and close up your houssis, your grangis, your barnis and all, and suffer na man cum therin, quhill it plesit God to put ane stay to this grete plage, and in the mein tyme, maid you to leve upon your penny, or on sic thing as comis to you out of the Lennos or Menteith; quhilk, gif ye do not, I se ye will ruine yourself; and howbeit I escape in this wayage,* I will nevir luik for to se you again, quhilk war some mair regrate to me than I will expreme be writing. Alwayis besekis you, as ye luif your awin wele, the wele of your houss, and us your freindis that wald your wele, to tak sum order in this behalf, that howbeit your evill favoraris wald cast you away, yit ye tak better keip upon yourself, and mak not thame to rejoce, and us your freindis to murne baith at anis; † quhilk God forbid, and for his guidnes preserve you and your posteritie from sic skaith, and manteine you in holie keping for evir. Of Ed^{r} this xxi day of September, be

"Your Bruther at power, the
"Bischop off Orknay." ‡

Notwithstanding the forebodings contained in this letter, Sir Archibald Napier managed to escape the contagion of the plague as well as the bishop; and the contagion of the times a great deal better. Having laid so much of that prelate's private correspondence before the reader, we must glance at his career in connection with the stormy period of history during the few years that John Napier spent on the continent. These embrace the time when Queen Mary

* With the Regent Murray to England. I find among the many curious notices contained in the Protocol Books of the city already referred to, that on the 5th October 1568, the Regent, on the eve of his departure, sent a letter to the town-council desiring them to continue their magistrates, least through the refusal or inexperience of persons newly chosen, the rigorous measures adopted against "the pest" should be obstructed. This the council obeyed under protest. Upon the 19th December 1568, a deputation is sent "to vesie the lands [*i. e.* houses] laitlie biggit on the Burrow Muir be Mr Archd. Grahame and Alexander Naper." Upon the 8th of April following, Will. Smyth and his "spous, Black Meg," are capitually condemned for "concealing the pest in their house."

† There seems more couched in this sentence than is plainly expressed. The expressions are hardly consistent with the mere risk of the plague. Perhaps the wily bishop here inculcates a lesson in politics to his upright brother-in-law?

‡ Original in Lord Napier's charter-chest.

was hurried, through some fearful steps, from her throne to exile and captivity; and it is curious to observe that the *dramatis personæ* of her unhappy story, at least in all its striking incidents, were chiefly composed of the near relatives and connections of Merchiston. The Bishop of Orkney and his cousin the justice-clerk, than whom two greater hypocrites never breathed,* were deeply implicated in the rebellion of the times, and parties to that diabolical plan to ruin the queen, which owed its success to treason, murder, rape, and forgery. Some time before the slaughter of Rizzio, they were in high favour with the assembly of the church. Upon the 29th December 1563, they were both named upon the select committee to whom was entrusted the sacred charge of revising and reporting upon the First Book of Discipline; and the bishop was still further honoured with the confidence of the church, by being appointed superintendant of Orkney under its special commission. But his career presented opposite phases. At the same time that he was favoured and consulted by the General Assembly, he was a successful courtier of his Catholic Queen. He had joined Mary in France for the express purpose of establishing himself in her good graces, and was not unsuccessful. Upon the 6th January 1563, about a week after he had been appointed to revise the discipline of the church, he was admitted, upon a letter from her majesty, to the place of an extraordinary Lord of Session, vacant by the promotion of Mr James Balfour, whose brother Gilbert was married to the bishop's sister. By its original constitution the Court of Session was to consist of an equal proportion of churchmen and laymen. But, like other reformations, that of the church professed at least a violent opposition to pluralities; and in the General Assembly held at Edinburgh in December 1564, "some brethren motioned that it might be demanded of the commissioners of Galloway and Orkney, if they thought that they might with a safe conscience discharge both the office of a superintendant and of a Lord in the Session. The answer to it and other questions was referred to another diet. The question was renewed at another assembly." †

* The bishop says in one of his letters, "with godly Job, gif we haif ressavit guid out of the hand of the Lord, quhai suld we not alsua ressaive evill," &c.; and the justice-clerk, in his testament, wherein he solemnly bequeaths to his eldest son his own worldly and nefarious policy, speaks of "this my saule quha baith sall meit my Maister with joy and comfort to heir that comfortabill voce, that he has promeist to resotat, saying, cum unto me thou as ane of my elect," &c.

† Calderwood.—*MS. Advocates' Library.*

Bothwell, notwithstanding these threatening interrogatories, not only retained his appointment of an extraordinary lord, but so little had his venerable coadjutors of the reformed church alarmed his conscience, that before another twelvemonth elapsed he accepted the place of an ordinary Judge of the Session; —thus pledging himself to duties which necessarily withdrew him from his ecclesiastical superintendancy. By the letter of his appointment, signed by Mary and Darnly, it appears that the queen had promised Orkney the first vacant seat as an ordinary lord; and that a vacancy having occurred by the death of Abraham Crichton, provost of Dunglass, she expressed her royal will that the bishop should be received into his place upon condition of being found duly qualified after examination. * We must now reckon him among those who obtained the appellation of the "adversaries of discipline," and he immediately became entangled in the most equivocal proceedings of the aristocratic party of the Protestants. He succeeded to his wish in acquiring power and influence in the state. To his bishoprick and seat among the Lords of Session was added the weight of a privy-councillor, his name appearing as such in the ordination for a tax of L. 12,000 to defray the expences of the baptism of James VI.

He was probably well aware of the desperate plot to murder Rizzio, those with whom he was most intimate being infamously conspicuous in that and other scenes of blood which rapidly followed. Patrick Bellenden was the greatest ruffian of that desperate band. He was the brother of the justice-clerk, who was also implicated and obliged to abscond until the privy-council cleared him. M'Gill of Rankeillor-Nether, Sir Archibald Napier's tutor, was another of the murderers, and lost his office of clerk-register in consequence. But Tullibardine and Sir James Melville, who were both within the palace at the time, narrowly escaped with their lives when Rizzio was slain, being marked in consequence of their well known affection to the queen. It is curious to observe the contrast betwixt the parts enacted upon this occasion by Patrick Bellenden and James Melville, who stood precisely in the same degree of relationship

* "13*th November* 1565.—The quhlk day the wryting underwritten wes produced. Rex et Regina. To our Chancellor, President, and Lords of our Council and Session: we promittit to our lovite Adam Bishop of Orkney the first ordinary place vacant in the session, and now there being one by the death of Mr A. Crightoun," &c. "it is our will ye receive him therin, &c. Subscribed with our hands at Edinburgh the 12th November 1565. "MARIE R. —*Pitmedden MS. Advocates' Library.* "HENRY R."

to our philosopher, the one being the cousin-german of his mother, and the other of his father. The Earl of Bedford and Randolph, in their letter to the council of England narrating the particulars, say, " There were in this companie two that came in with the king,—the one, Andrewe Car of Fawdenside, whom the queen sayth would have stroken her with a dagger; and one Patrick Balentine, brother to the justice-clerk, who also, her grace sayth, offered a dag against her belly with the cock down." * It is a relief to turn from this to the conduct of Melville. " The nyxt mornyng," says he in his Memoirs, " quhilk was Sonday, I was lettin fourth at the yet, for I lay therein. Passing throw the utter close, the queenis majeste was loking fourth of a window, and cryed unto me to help hir. Then I drew neir unto the window, and askit what help lay in my power I suld mak. Sche said, go to the provest of Edenbrough, and bid him, in my name, convene the toun with speid, and com and releave me out of thir traitouris handis. ' Bot run fast,' said sche, ' for they will stay you.' " Melville executed her commands with his usual fidelity.

The crisis of the murder of Darnly also involves the names of the philosopher's near relations. James Murray, the brother of Tullibardine, actuated by motives which cannot now be fathomed, affixed to the door of the tolbooth of Edinburgh a placard in reply to the proclamation for the discovery of the murderers. Of this placard, Cecil, the English secretary, gives in the Cabala the following as the substance:—" I, according to the proclamation, have made inquisition for the slaughter of the king and do find, the Earl of Bothwell, Mr James Balfour parson of Flisk, Mr David Chambers, and black Mr John Spence, the principal devisers thereof; and if this be not true, spier at Gilbert

* That is to say, a *cocked pistol*. In a letter to Secretary Cecil upon this occasion, dated 4th April 1566, Randolph writes, " The justice-clerk in hard terms, more for his brother's cause than any desert," &c. There is no doubt, however, that Sir John Bellenden was devoted to Morton, and ruled both his brother Patrick and the Bishop of Orkney. I find a charter of confirmation under the great seal (dated three weeks before the murder) to Patrick Bellenden of Stenhouse, Sheriff of Orkney, and Katherine Kennedy, his spouse, in conjunct fee, and to the heirs-male betwixt them; whom failing, the heirs-male of Patrick's body; whom failing, to John Bellendene of of Auchinoule, Knight, justice-clerk, brother of the said Patrick, and the heirs-male of his body; whom failing, to Patrick Bellendene, the natural son of the Sheriff, &c. proceeding upon a charter from Adam Bishop of Orkney and Zetland, with consent of his chapter, of all the lands belonging to the said bishoprick lying within the parish of Ewie, with part of the lands of Bustane, &c.; and also all the lands belonging to the bishoprick lying within the parish of Stenhouse, &c. to be held of the bishop and his successors. The charter of confirmation is dated at Edinburgh, 18th February 1565–6.—*Diplomata Regia, v. x.* p. 90, *MS. Advocates' Lib.*

Beafour." Cecil adds, that there were also words which touched the Queen of Scots. This inflammatory and mysterious placard was unsigned; but is well known to have been put up by James Murray, the same who afterwards challenged Bothwell to single combat. Sir James Balfour, who became President of the Court of Session, is said to have been the original deviser of the murder of Darnly; and the house blown up belonged to the family. Gilbert Balfour mentioned in the placard, was his brother, and undoubtedly the same person alluded to in the Bishop of Orkney's correspondence. By his marriage to Margaret Bothwell he was the uncle of John Napier.

The circumstances of Bothwell's trial and acquittal are well known. To the suspicious verdict of his jury, he deemed it necessary to add the bravado of a personal challenge to any one that dared impugn him. This he affixed to the most public quarter of the town, and it was immediately replied to by James Murray in an anonymous placard, declaring that he accepted the combat, provided the lists were so arranged that the acceptor would be certain of fair play when he disclosed his name. Upon the 14th of April 1567, two days after Bothwell's acquittal, a Parliament was held at Edinburgh, wherein commissioners were appointed, of whom the Bishop of Orkney was one. "After the rising of the Parliament," says Keith, "in which the Earl of Bothwell is marked every day to have been present, a very infamous and remarkable scene did quickly open. This was the subscribing a bond by a great many of the nobility in favour of the Earl of Bothwell, bearing testimony of his acquittal of the late king's murder,—recommending him as a proper person upon several accounts for partaking the honour of the queen's bed,—and pledging their mutual assistance in defence of the Earl's marriage with her majesty." To this disgraceful bond the Bishop of Orkney's name is attached. Immediately followed the seizure and abduction of the queen by the Earl of Bothwell, with all its diabolical concomitants. "She yielded to that," says Bishop Leslie, "to the which these crafty colluding seditious heads, and the necessity of the time, as then to her seemed, did in a manner enforce her."* On the 12th of May thereafter, the queen, no longer a free agent, and with a broken spirit and disordered mind, was led by the infamous Bothwell to the Court of Session, and in presence of the Lord Chancellor, President, and other Lords, among whom sat the Bishop of Orkney, pronounced the celebrated speech, in which

* For the proofs of Mary's innocence, consult Goodall, Tytler, and Whittaker, and compare with Hume and Robertson.

she declared that she had forgiven the violence committed on her person, and that she was no longer under restraint.

Having obtained the collusive divorce from his own spouse, the Earl of Bothwell, now Duke of Orkney, found considerable difficulty in prevailing upon any of the reformed clergy to publish the banns with Mary. Sir John Bellenden was particularly active in removing this obstacle. He managed to obtain, and carried a letter from the queen herself to the minister John Craig, in which she declared that she was under no restraint. " His answer was, that he could ask no banns, especially such as these were, without the knowledge and consent of the church. The matter being motioned in the session of the church, after much reasoning kept with the justice-clerk, it was concluded that the three next preaching days the queen's mind should be intimated to the people."* The banns being published, the next difficulty was to find a bishop who would bless them. One bishop was found, says Buchanan with the severest point of his elegant Latinity, one, the Bishop of Orkney, who preferred the smiles of a court to the light of truth, while others declined the task, and pointed out the unhallowed nature of nuptials with him who had already two spouses alive, and had lately obtained himself to be repudiated by a third on the ground of his own adultery.† Sir James Melville gives the following view of the bridegroom immediately before the marriage :—" I taried not at court, but now and then, yet I chancit to be ther at the mariage. When I cam that tym to the court, I fand my Lord Duc of Orkney sitting at his supper. He said I had bene a gret stranger, desyring me to sit down and soup with him. The Erle of Huntly, the *justice-clark*, and dyvers uthers, wer sitten at the table with him. I said that I had already souped. Then he callit for a coup of wyn, and drank to me, that I mycht pledge him lyke a Dutcheman. He bad me drink it out, till grow fatter; for, said he, the zeall of the commoun weall has eaten you up, and maid you sa lean," &c. ‡ — " The marriage was

* See Craig's defence printed in the Appendix to Dr Cook's History of the Reformation.

† " Unus, *Orcadum Episcopus*, est inventus, qui gratiam aulicam veritati præferret, cæteris reclamantibus, caussasque proferentibus, cur legitimæ non essent nuptiæ cum eo, qui duas uxores adhuc vivas haberet, tertiam, ipse nuper suum fassus adulterium, dimisisset," &c.—Lib. 18, § 30.

‡ Melville then adds, that the Duke of Orkney began a conversation about " gentilwomen," so unpleasant " that I left him, and passed up to the queen, wha was very glaid of my cummyng." Dr M'Crie, who only knew of the spurious edition of Melville's Memoirs, has endeavoured to detract from his character and credit. Among other objections, the biographer of Knox says, " We find him exposing himself to danger, by *dissuading his mistress from marrying Bothwell*, and yet counte-

maid in the Palice of Halyrudhouse, at a preaching be Adam Bodowell, Bischop of Orkeney, in the gret hall for the consaill uses to sit, according to the ordour of the reformed religion, and not in the chapell at the mess, as was the kingis mariage."* The queen had now reached the dregs of her bitter cup, and shamefully were they pressed upon her. "Not a spear," says a beautiful writer, "was lifted, not a sword drawn to rescue Mary from the power of that atrocious ruffian. She was suffered, without either warning or opposition, to unite herself with this worthless man, and it was not until her honour became inseparable from his, that the same advisers changed their note, sounded an alarm to the nation, and called on all true subjects to rescue the queen from the control of Bothwell."† This reproof falls justly upon the men whose influence and admonitions, had they been united with those of Lord Heries and James Melville, might have extricated Mary from her toils; but the hour of redemption was passed when they meet her on Carberry-Hill.

To that spot where the Duke of Orkney's short and nefarious reign concluded, and where, for the last time but one, the unhappy queen seemed to command an army, we must now turn; for here, too, among the most conspicuous *dramatis personæ* were the relatives of Merchiston, Sir William Kirkcaldy of Grange, and the Murrays of Tullibardine. While the armies stood viewing each other, Grange, at the head of 200 horse, rode round the hill to obtain a favourable position for charging Bothwell. The manœuvre attracted the queen's attention; and when she heard that this threatening body of chivalry was led on by him whom Europe acknowledged as the bravest and most distinguished knight of his times, she sent the Laird of Ormeston to desire him to come and speak to her under a flag of truce. Grange, like his uncle Melville, was in his heart devoted to Mary, and scorned the false slander that identified her misguided and faltering steps with the gory stride of Bothwell. Against the latter he was now in arms, with that spirit which, but for the indelible stain of murder on his own shield, would have made him the

nancing the marriage by his presence." Had Melville's power equalled his inclinations, Mary would have been saved. He "chancit to be ther at the mariage," as he tells us himself. What of that? To admit that he dissuaded Mary from that fatal step, is, considering the state of the times, the highest compliment that could be paid to his courage and integrity.

* Birrel in his Diary says, "the 15 of Maii 1567 the Queine was maried to the Duck of Orkney, in the chappel royall of Holyrudhous, by Adam Bothuel, Abbote of Holyrudhous; and hes text wes the 2d of Genesis."

† Sir Walter Scott.

Bayard of his times. He lost not a moment in being at the side of his sovereign. "All in this field, madam," said the gallant Grange, "will love, honour, and serve you, if you will only abandon the murderer of your husband." While he was uttering these words, a soldier, ordered to the deed by Bothwell, had raised his harquebuss, and was in the act of taking deliberate aim at his life; but the queen shrieked out to save him, and exclaimed, "Shame me not with so foul a murder." Bothwell covered his confusion by a vaunting offer of the combat to any man who would decide the day singly with himself. "You shall have an answer speedily," said Grange, as he spurred his horse down Carberry-hill, to join his own comrades in the distance. There was one in that host especially bound to accept this challenge. James Murray had, upon a former occasion, accepted the same offer, though anonymously. Now he stood forward in the face of the two armies to avow his challenge. Bothwell rejected his gauntlet as that of one not equal in rank to lift his own. "I at least," then exclaimed Tullibardine himself, "am your peer. My estate is better than yours, and my blood is more noble."* This offer, however, and a challenge of a similar nature from Grange, were all scornfully rejected by the Duke. Lord Lindesay, a ruffian like himself, gave him the option of an opponent who was technically his peer. "But," says Melville, "his hart cauldit ay the langer the mair;" so he prepared himself for flight. Mary, who had been crushed by his treason and tyranny, now learnt to despise him for his cowardice. She again sent for Grange, and told him, that if she were certain of the reception he promised her, she would abandon Bothwell. Grange asked the leaders of his own party if he might assure the queen of their loyalty on those terms. Upon the most solemn declaration that he might, he rode back to the queen, who looked upon him as her friend, and a true knight among a host of insidious enemies. She met him half-way, and said, "Lard of Grange, I render me unto you, upon the conditions ye rehearsit unto me in the names of the Lordis;" and gaif him her hand, quhilk he kessit, and led hir majeste be the brydell doun the bra unto the Lordis, wha cam fordwart and met hir; the noblemen using all dewtyfull reverence; but some of the rascallis cryed out dispytfully, till the Lard of Grange drew his sword, and sa did some uthers that knew ther dewtie better, and straik at such as spak unreverent langage, quhilk the nobilitie allowed weill of."† The queen and

* Knox's History.

† Melville's Memoirs.

Grange were both deceived. The traitor nobles kept no faith with them, and their system of forgery commenced. After suffering the most inhuman indignities, which brought disgrace on Scotland and its capital rather than on her, Mary was lodged in the castle of Lochleven.

In this memorable scene of her story, wherein she is compelled to abdicate in favour of her son, the reader must be introduced to another cousin-german of Merchiston who acted a conspicuous, but kind and honourable part. This was the second son of Helen Napier, Sir Robert Melville of Murdocarny. Like his brother James, he had become highly distinguished as a statesman and diplomatist, without, however, following so brilliant a career in foreign courts. He had been resident ambassador at the court of Elizabeth, where he was held in the highest estimation, but was in Scotland about the close of the year 1566, when he obtained a grant of the office of hereditary keeper of the palace of Linlithgow. In the following year he was engaged in the negociations with the queen at Lochleven. Being full of experience, and his reputation of the highest, his assistance was eagerly sought; but, like all his race, he was devoted to the queen, and among the steel clad barbarians that persecuted her there, Sir Robert Melville appeared like her guardian angel. The object of the rebels was to obtain her signature to three deeds carefully prepared for the purpose. The first was that of her abdication in favour of James. The second was the appointment of her bastard brother to the regency; and the third named a council to regulate the affairs of the state until Murray accepted the office. These deeds were dated 24th July 1567. In that of the abdication, one of the commissioners named in the body of the instrument, as if empowered by Mary to receive her renunciation of the throne, is Adam, Bishop of Orkney.* When these were first laid before her by the very hands that had committed murder in her presence, the spirit of her fathers rose once more to the regal brow of Mary of Scotland, who declared,

* Dr Barry, in his history of the Orkney Islands, says of Adam Bothwell, "Notwithstanding his having joined the enemies of the queen, Mary seems still to have retained for him some degree of her former favour; for when her unfortunate circumstances compelled her to resign the crown, she granted a procuration to him to inaugurate her son, the young prince, which was accordingly done at Stirling."—P. 244. This is a great mistake. Mary never even read the deed which named the bishop. It was her enemies who devolved the office on him, not as *her* friend, but as *their* creature.

that sooner would she renounce her life than her crown. It was not the brutal grasp of Lindesay that made her quail. " She was induced," says Spotiswood, " to put her hand to the renunciation they presented, by the persuasion chiefly of Robert Melvil, who was sent from the Earl of Athol, and Lethington, to advise her, as she loved her life, not to refuse anything they did require. He likewise brought a letter from Sir Nicholace Throgmorton, the ambassador of England, (who was come a few days before to visit her but was denied access,) to the same effect, declaring, that no resignation made in the time of her captivity would be of force, and in law was null, because done out of a just fear; which having considered with herself a while, without reading any of the writs presented, she set her hand to the same, the tears running down in abundance from her eyes." *

The next important occurrence was the coronation of James VI. From the records of the privy-council we learn, that, upon the 29th July 1567, Adam Bishop of Orkney anointed the baby king. The rebel Lords and their adherents assembled for that purpose in the parish church of Stirling. Among the cortege were conspicuous the bishop and his cousin, " Sir Johne Bellenden of Auchinoull, knycht, clerk of justicarie; and Sir William Murray of Tullebardine, knycht, comptrollar." The extorted deeds were produced. For the young king, " James Earl of Mortoun inclynand his bodie, and layand his hand on the buik of God, in name and upoun the behalf of his grace, solempnlie maid the ayth and promeiss," &c. after which " the said Lordis of the nobilitie," &c. " be the ministration of the said reverend fader, Adame Bischope of Orknay, anointed the said maist excellent prince, in king of this realme and dominiounis thairof, investit and inaugurat his grace thairin, deliverit in his hands the sword and sceptour, and put the crown royall upoun his heid with all

* Sir Walter Scott, in his romantic description of their progress to Lochleven upon this mission, draws the following portrait of Sir Robert Melville: " The personage who rode with Lord Lindesay at the head of the party was an absolute contrast to him in manner, form, and features. His thin and silky hair was already white, though he seemed not above forty-five or fifty years old. His tone of voice was soft and insinuating; his form thin, spare, and bent by an habitual stoop; his pale cheek was expressive of shrewdness and intelligence; his eye was quick, though placid, and his whole demeanour mild and conciliatory. He rode an ambling nag, such as were used by ladies, clergymen, or others of peaceful professions; wore a riding habit of black velvet, with a cap and feather of the same hue, fastened up by a golden medal; and for show, and as a mark of rank rather than for use, carried a walking sword, as the short light rapiers were called, without any other arms, offensive or defensive."

due reverence," &c. "quhairupon the said Sir Johne Bellenden justice-clerk, in name of the said estaitis, and also John Knox minister, and Robert Campbell of Kinzeancleugh, asked actis, instrumentis and documentis." *

The Duke of Orkney in his flight from Carberry-Hill, being well aware of his desperate situation, stood at gaze for a moment in the castle of Dunbar, and then started northward to seek refuge among the stormy intricacies of those islands from which he derived his infamous title. Being Lord High Admiral of Scotland, he contrived to fit out and arm some light piratical vessels, fleet as falcons, and well adapted to the dangers of those narrow seas. His first attempt was to fortify himself in the castle of Kirkwall. But he was frustrated in this object by John Napier's uncle, who commanded there. Probably the constable had received his instructions from the Bishop of Orkney. That prelate was eager for the apprehension of the fugitive; † and the persons to whom the party of the Earl of Murray immediately looked as the fittest to command the expedition that was to accomplish the destruction of this dangerous outlaw, were the philosopher's other relatives so often mentioned, Sir William Murray of Tullibardine, and Sir William Kirkcaldy of Grange. Their daring characters marked them for such an enterprise; and the rejection of their gauntlet at Carberry-Hill left them a personal insult to avenge. They were accordingly associated in this undertaking, which, notwithstanding the government force placed under their command, promised sufficient difficulty and danger to add another zest to their object. ‡

Upon the 19th of August 1567 their armament was complete, and set sail for the Orkneys. But the Duke of Orkney was reserved for a fate less honour-

* Keith. Privy-Council Records.

† Spotswood says, that Bothwell's purpose "was to have remained in the castle of Kirkwall, and if any did pursue him, to take himself to the ships; but the keeper, Gilbert Balfour, would not receive him, so as he was forced to return to sea."

‡ There is a charge in the register of privy-council, dated 10th August 1567, to some particular masters of ships belonging to the town of Dundee, and in general to all masters of ships and other mariners, indwellers within the burgh, to prepare themselves and their ships to pass with Sir William Murray of Tullibardine, the comptroller, in quest of the Earl of Bothwell, within six hours after they be charged; and on the 11th day of the same month, there is a commission to Sir William Murray, comptroller, and Sir William Kirkcaldy of Grange, to convey the king's lieges in warlike manner, and provide ships to pursue the Earl of Bothwell, his assistars, or colleagues, by sea or land, with fire, sword, and all kind of hostility, and fence and hold courts of justice wheresoever they shall think good.

able than to die on his deck. His pursuers, with five ships heavily armed and carrying four hundred soldiers, soon reached the Orkneys, from whence they were directed, probably by Gilbert Balfour, to Shetland as the covert of their quarry. It was not long before two vessels were descried cruising off the east coast of Shetland, where currents, tides, and whirlpools threatened destruction to the most skilful navigator. These vessels were the Duke of Orkney's on the look out, and manned by desperate seamen. Grange, who commanded the swiftest of the government ships, shot a-head, and approached Bressa Sound through which the pirates steered. Onward pressed their pursuers, and every nerve was strained on board the Unicorn, Grange's ship, to gain their object. The manœuvre of the fugitives would have done credit to the more practised days of the Red Rover. So close was the chase, that, when the pirate escaped by the north passage of the sound, Grange came in by the south, and continued the chase northward. But the fugitives were familiar with those narrow and dangerous seas. They knew how lightly their own vessels could dash through the boiling eddy that betrayed a sunken rock, and discerned at a glance what would be the fate of their bulky pursuers if they dared to follow in their desperate track. They steered accordingly upon breakers; and though the keel grazed the rocks, their vessel glided through the cresting foam, and shot into a safer sea. Grange ordered every sail to be set to impel the Unicorn in the very same path. In vain his more experienced mariners remonstrated. The warlike baron, as if leading a charge of horse in the plains of Flanders, rushed on the breakers, and instantly his gallant ship was a wreck,—there being just time to hoist out a boat and save the ship's company and soldiers. As it was, one warrior heavily armed still clung to the wreck, and the boat being already on its way deeply laden, it seemed impossible to save this being from destruction. His cries reached them, but were disregarded;—another instant of delay and he had perished, when, collecting all his energies, he sprung with a desperate effort into the midst of the crowded boat, causing it to reel with his additional weight, encumbered as he was with a corslet of proof: "which," says Godscroft, who records the incident, "was thought a strange leap, especially not to have overturned the boat." Who would have surmised that this athletic man-at-arms, the last to quit the wreck, was a bishop!—the bishop, who had so lately joined the hand of him he pursued, with that of Queen Mary!—the very bishop, who a month before had poured the holy oil on the infant head of James VI. and stood proxy for the extorted abdication of that mo-

narch's mother. It was Adam Bothwell, Bishop of Orkney. The rock from which he leapt can be seen at low water, and is called the Unicorn to this day. *

It is remarkable, that, at the very time when the bishop was so conspicuous in his enmity to the Duke of Orkney, the General Assembly of the Church entertained their highest indignation against him for having married that nobleman to the queen. In the Assembly held at Edinburgh on the 25th December 1567, just five months after the exploit above recorded, "Adam, called Bishop of Orkney, commissioner of Orkney, being absent, was delated for not visiting the kirks of his country, but from Lambmess to Hallowmess: *Item*, That he occupied the room of a Judge of the Session, the sheep wandering without a pastor: *Item*, Because he retained in his own company Sir Francis Bothwell, a Papist, to whom he had given benefices, and placed a minister: *Item*, Because he solemnized the mariage of the queen and the Earl of Bothwell, which was altogither wicked, and contrair to God's law and the statutes of the Kirk." † Again, "Anent the mariage of the queen with the Earl of Bothwell, be Adam callit Bischop of Orkney; the haill kirk finds that he transgrest the act of the kirk in marieing the devorcit adulterer; and therefore deprives him fra all function of the ministrie, conform to the tenor of the act made thereupon, ay and quhyll the kirk be satisfyit of the

* Hume of Godscroft's History of the House of Douglas,—Edmonstone's Zetland Islands,—Sir James Melville's Memoirs.—Speaking of this pursuit, Melville says, "Now the lard of Grange twa schippis being in redines, he maid saill towardis Orkenay; and na man was sa frak to accompany hym as the Lard of Tullibardin and Adam Bodowell, Bishop of Orkenay." Tullibardine's keenness is easily accounted for; and, from the records of the privy-council, it appears that he held the government commission as leader in the expedition. But why *the bishop* was there is a question. So dangerous an enterprise, undertaken by one of his timid and luxurious habits, must have had a powerful stimulus, and may be thus accounted for: Tullibardine and Grange were armed not only with authority to apprehend the Duke of Orkney, but to hold courts of justice wherever they might take him, obviously for the purpose of his *immediate* condemnation. But these barons, who were both above the duplicity of the times, would have cut an awkward figure in their judicial capacity had it been left entirely to them, and probably their impulse would have been to bring the Duke back, to be again tried by his peers in the face of his country. But it was desirable to the Morton faction that he should be instantly put out of the way, and in a manner least likely to elicit disclosures; so, to aid the warlike barons when the hour of fight was over, and to countenance them in their judicial functions, Adam Bothwell, a privy-councillor and a Lord of Session, accompanied the expedition, and no doubt had his instructions.

† Calderwood.

slander committed by him."* Calderwood adds, " Adam called Bishop of Orkney pretended he might not remain in Orkney by reason of the evil air and weakness of his body. He denied that he understood Francis Bothwell to be a Papist, or that he placed him in the ministry. He was deprived of all functions in the ministry, for solemnizing the mariage betwixt the queen and the Earle of Bothwell, contrair to ane act made against the mariage of the devorced adulterer, till the Assembly were satisfied for the slanders committed be him." There appears, however, an act of the General Assembly restoring the bishop on the 10th of July 1568, in these terms :—" Toutching the Bischop of Orkney's suspensione from the ministrie the last Assemblie, and his obedience and submission; the kirk restoris him again to the ministrie of the word, and als ordains him on some Sunday, quhen he best may for waiknes of his body, to mak an sermoun in the kirk of Halieruidhouse, and in the end thereof to confess his offence in marieing the queene with the Erle of Bothwell; and desire the Kirk thair present for the time, to forgive him his offence and sclander given be him in doing the fornamit act: the quhilk he promisit to do." Shortly before the date of this act, namely, on Sunday the 2d of May 1568, the queen escaped from Lochleven; and on the 13th of the same month the battle of Langside was fought, which decided her fate, when she fled to England. This brings us down to the period of the Bishop of Orkney's letter to Merchiston on the subject of the plague; and it remains to notice the result of the voyage to which he therein alludes.

A scene, the most disgraceful to both countries, now occurred at the conferences held at York and Westminster, where a rebel faction familiar with the darkest crimes, and a rival queen, destitute of every feminine virtue, combined to consummate the ruin of the Queen of Scots. It was upon this occasion that Mary was deliberately accused of having been an accessory before the fact to the murder of her husband. But happily the very mode in which the accusation was preferred, and the shameless forgeries with which it was attempted to be supported, no less than the total absence of every principle of law and justice which characterized the whole proceedings, afford the strongest refutation of the charge. These disgusting proceedings I shall only notice, in order to follow out the train of historical connections which subsist betwixt the domestic annals of Merchiston and those of his country and the times.

* Acts of Assembly.

James and Robert Melville were both present at that memorable mockery of judicial procedure. James Melville, and his nephew Grange, whose eyes were now completely opened to the duplicity of Murray's faction, had endeavoured to prevent a step so degrading to the nation. But the honest party in Scotland were too weak to protect either the honour of Scotland or the queen; and some, says Melville, including himself, "that culd not get the regent disswadit fra this extream folly at hame, past with him in England, to se gene be any assistance of sic as wer frendis ther to the union of this yll, and to the title of Scotland, mycht, perchance, mak them some help to get the accusation stayed." Conspicuous in the commission against the Queen of Scots, chiefly composed of the murderers of Rizzio, was our philosopher's worthy uncle, the Bishop of Orkney, as representing the spiritual estate. On the other side were marshalled some of the few nobles left to unhappy Scotland, who possessed the feelings of humanity and the honour of gentlemen. With these was the good Bishop of Ross, and, says Melville, "my brother, Sir Robert Melvill, an onwaiter to do the gud he culd." A complete history of that commission (for which Sir James Melville has furnished materials that have not been taken advantage of by our partial, though classic, historians) I leave to those who have yet to redeem the annals of our country, in some essential points, from ignorance and error. There is one scene, however, in which the Bishop of Orkney became so ludicrously conspicuous as to require notice here.

When the commissioners first met at York, the Duke of Norfolk cast various obstacles in the way of the accusation; and after sounding Lethington, opened a secret conference with him and the Regent Murray, the object of which was to frustrate the designs of Elizabeth. No one was privy to this counter-plot except Norfolk, Murray, Lethington and James Melville; and the plan proposed is minutely recorded by the latter. The Duke, after expressing his private horror and astonishment at the step the commissioners were about to take, said, "I am send to heir your accusation, bot nother will the quen, my mestress, nor I, dicern nor geve out any sentence upon your accusation; and that ye may understand the veritie in this point mair clearly, ye sall do weall, the nyxt tym that I requyre you before the consail to geve in your accusation in wret, to demand again the quen, my mestres, seale and handwret, before ye schaw your foly; that incaice ye accuse, that sche sall immediately convict and geve out hir sentence; otherwayes that ye will not open your pak; quhilk geve hir Majeste sall refuse to grant unto you, quhilk undoubtedly sche will

do, then assure your self that my information is rycht, and tak occasion therupon to stay fra fader accusation."

The accusation here alluded to was that held in petto by Murray and his crew, wherein Mary was denounced as a murderess; her marriage to Bothwell being urged as one of the principal proofs, and the very bishop who had pronounced his blessing over that marriage being the keenest of the accusers, Elizabeth vehemently desired that this accusation should be unconditionally presented; and when the counter-claim suggested by Norfolk was made, the delay occasioned by communicating with her majesty at such a distance caused the commission to be moved from York to the court. The Regent Murray, whose conduct bewildered such of his colleagues as were not in the secret, was incessantly importuned by the Bishop of Orkney, and the most violent of the faction, to give in the accusation unconditionally. At length Morton discovered the substance of what had passed betwixt the Duke and the Regent; and, being highly offended at the exclusion of himself from their conference, laid a plan with his colleagues to defeat the object of it. Murray's secretary, John Wood, a thorough paced traitor, was made to disclose the whole matter to Cecil, who at their suggestion became more and more urgent. They pretended, however, to stand by the condition to which Murray had pledged himself. The rest of this extraordinary scene is best pourtrayed in Melville's own words: "Master Jhon Wod said, that it was meit to cary in all the wretis to the consail house, and he suld keip the accusation in his bosome, and suld not delyver it without all conditions wer also kepit to him. The rest of the Regentis lordis and consellours had concludit amang them, that sa schone as the Duc of Norfolk, as cheif of the consaill, wald inquyre for the accusation, that they suld all with a voice cry and persuad the Regent to ga fordwart with it. The secretary Liddingtoun and a few uthers remembrit the Regent, how far he had obligit himself to the Duc of Norfolk. He said he suld do weal anough, and that it wald not com that far agaitwart. Sa schone as he with his consaill wer within the consaill house, the Duc of Norfolk askit for the accusation. The Regent desyred again the assurance of the conviction, be wret and seale, as said is. It was answerit again, that the quenis majesteis word, being a trew Princes, wald be sufficient anough. Then all the consaill cryed out, wald he mistrust the quen, wha had geven sic proif of hir frendschip to Scotland? The regentis consaill cryed out also in that same maner. Then the Secretary Cicile askit, gene they had the accusation ther. 'Yes,' said Mester Jhon

Wod, (with that he pluckis it out of his bosome) ' bot I will not delyver it untill her majesteis handwret and seale be delyverit to my Lord.' Then the *Bischop of Orkeney* cleakis the wret out of Mester Jhon Wodis handis. ' Let me have it, I sall present it,' said he; Mr Jhon ran efter him as gene he wald have had it again, or riven his clais. Fordwart past the bischop to the consaile table, and gave in the accusation. Then said to him my Lord Willyem Hauvert, chamberlan, ' Weill done Bischop Turpy; thou art the frackest felow amang them; none of them all will mak thy loup gud;' scornen him for his lowping out of the lard of Grange schip. Mester Hendre Belnaves only had maid resistance, and callet for the Secretary Liddingtoun, wha taried without the consaill house; bot sa schone as Mester Hendre Belnaves had callet for him he cam in, and roundit in the Regentis ear that he had schamed himself, and pat his lyf in parell by the loss of sa gud a frend, and his reputation for ever. The Regent, wha had bene brocht be his facilite to brek with the Duc of Norfolk, repented him again sa schone as Liddingtoun had schawen him the danger, and desyrit the accusation to be renderit to him again; alleging that he had some mair to add unto it. Bot they said, that they wald hald that quhilk they had, and wer ready to receave any uther addition when he pleased to geve it in. The Duc of Norfolk had anough ado to keip his contenance; Mr Jhon Wod winket upon the Secretary Cecill, wha smyled again upon him; the rest of the Regentis company were lauchen upon other; the Secretary Liddingtoun had a sair hart; the Regent cam fourth of the consaill house with the tear in his eye, and past to his loging at Kingistoun, a myll from court, where his factious frendis had anough ado to comfort him."*

The church was not appeased by the bishop's harlequin activity upon this disreputable service. The commissioners returned in the month of February 1568-9; † and in the General Assembly held in July following, " Adam

* Melville's Memoirs, p. 211, 212.

† It was in 1569 that the Regent Murray was assassinated; and it is curious to observe, that the person who is said to have been the indirect cause of his fate was the bishop's cousin, Sir John Bellenden. In some of the interested transactions to which the struggle for life and place and property after the battle of Langside gave rise, the justice-clerk obtained a gift of the lands and mansion-house of Woodhouselee. These had belonged to Hamilton of Bothwellhaugh, a man, like all of his name, devoted in the cause of Queen Mary. Under the auspices of the Regent, Bellenden obtained a transference in his own favour, and took possession with such inhuman violence, as to drive Hamilton's lady out of the house in a stormy night, which impaired her reason. It is well known that Bothwellhaugh took his revenge upon the Regent himself.

Bishop of Orknay was accused for not fulfilling of the injunction appointed by the Assembly in the month of July 1568." No further notice of him appears in the acts of Assembly until the 25th of February 1569-70, of which date the following detailed accusation stands recorded against him:—" Adam of Orknay being called to the office of a bishoprick, and promoted to the profits thereof, and suffered by the kirk, receives charge to preach the Evangell, to be also commissioner of the country of Orknay, which he received and exercised for a certain space; while now of late he made a simoniacall change with the abbacie of Halirudhous, although yet brooking the name, and stiled Bishop of the same; contrary to all lawes, both of God and man, made against simony. Secondly, he dimitted his cure in the hands of an unqualified person without the consent of the kirk, leaving the flock destitute without a shepheard, whereby not onely ignorance is increased, but also most aboundantly all vice and horrible crimes there are committed, as the number of 600 persons convict of incest, adultery, and fornication, beares witnes. Thirdly, he hath given himselfe daily to the execution of the function of a temporall judge, as to be a Lord of Session, which requires the whole man, and so rightly in naither can he exercise both: And stiles himselfe with Romane titles, as Reverent Father in God, which pertaines to no minister of Christ Jesus, nor is given to any of them in Scripture. Fourthly, in great hurt and defraud of the kirk, he hath bought all the thirds of the abbacie of Halirudhous; at least, he hath made simoniacall change thereof with the rents of Orknay. Fifthly, he hath left the kirks partly unplanted and partly planted, but destitute of provision. Sixtly, some of the kirkes are sheepfolds, and some of them ruinous. Seventhly, he hath traduced, both publikly and privatly, the ministers of Edinburgh, absented himselfe from preaching in that kirk, and from receiving the sacraments."*

The simoniacal exchange of which the bishop is here accused, seems to have been forced upon him rather to his disadvantage in the year 1569, in favour

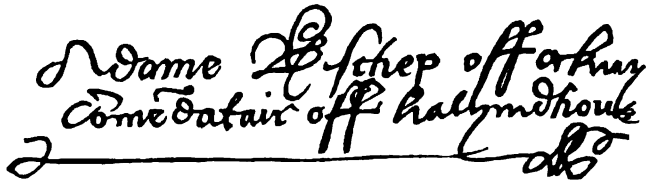
* " Acts of the Generall Assemblies concerning the Adversaries of Discipline." See also Calderwood's MS. *Adv. Lib.*—Calderwood says, " the bishop presented his answers to the tenth session. Mr Knox, Mr John Craig, and Mr David Lindsay, were appointed to try the sufficiency of these answers, and to report to the next Assembly; but I find them not. Yet ye may see what thingis they judge offensive in bishops or ministers." Bothwell's diocese comprehended the Isles, Orkney, Zetland, Caithness, and Stranaver; and his fixed residence ought to have been Kirkwall.—*Book of Discipline.*

of a natural son of James V., Robert Stewart, afterwards Earl of Orkney.* Be this as it may, our prelate continued to retain both the abbacy of Holyrudhouse, and the style of Bishop for the remainder of his life; and ever after this exchange, indulged in the imposing signature, "Adam, Bishop of Orkney, Commendator of Holyrudhouse." †

While the fact of John Napier's foreign education seems unquestionable, it is a mistake, though a prevalent one, ‡ to suppose that he spent the best years of his manhood abroad, and that upon no occasion after his return did he interfere with or interest himself in public affairs. He was certainly at home in 1571 (being just of age) when the preliminaries of his marriage were arranged at Merchiston; and for many years after that event, he took an earnest and even a leading interest in the affairs of the church, which composed the most engrossing politics of the day.

* See act of Parliament 1592, entitled, "Exceptioun in favour of Adam Bischope of Orknay."

† The following deed among the Merchiston papers affords a good specimen of the Bishop's autograph. "We, Adame be the permissioun of God, commendater of the Abbay of Halycroce besyd the bruch of Edinbruch, and convent of the samin cheptourlie gadderit, the utilitie, weill, and proffeit of us and our said place being alwayis forsene and considerit, lang and mature deliberatioun and avyss had theirintil; and als for certan gret soumes of money payit and delyverit to us and our said convent for performing and setting forwarts of certan gret effairis and besynes concerning us and our said place, and sustentatioun of the said convent, be our lovit, Sir Archibald Neper of Edinbelly, knycht," &c. therefore setts to Sir Archibald, and to "Jhon Neper, his sone and apperand air, and Francis Neper, als sone to the said Archibald," &c. "all and syndrie our teindschaiffis of the lands of Merchinstoun," &c. for 19 years. At Leitcht the xxiiii October 1571."



‡ Lord Buchan says, "I have not been able to trace Merchiston from the university (St Andrews) till the publication of his plain discovery at Edinburgh, in the year 1593." In the recent account of the baron, published in London by the Society for the Diffusion of Knowledge, it is said, that, "on leaving College, Napier is understood to have set out on his travels, in the course of which he visited France, Italy, and Germany. It is not known when he returned home; but he was probably a considerable time abroad, since we hear nothing farther of him till he was above forty years of age. On arriving again in his own country, although he had already acquired considerable reputation for abilities and learning, and might probably have entered upon a political career with many advantages, he declined interfering in public affairs, and retired to Merchiston with the intention of devoting himself exclusively to study."—*Library of Entertaining Knowledge.*

The important subject of his marriage is first met with among the archives of his family, in a contract dated 23d February 1571-2, wherein are these words: "Till all and sundry," &c. "Archibald Naper of Edinbillie, Knycht, that albeit the Rycht Honorabill Sir James Striveling of Keir, Knycht, with consent and assent of Jane Cheisholime, his spouse, for fulfilling of ane contract of mairage maid betwix thame and Elizabeth Striveling, thair dochter, on the ane part, and ane reverend fader in God, Adam, Bischop of Orknay, commendator of Halyrudehouse, me the said Archibald, and Johne Naper my sone and apperand air, on the uther part, for mairage to be maid and solemnized betwix the saidis Elizabeth and Johne Naper." The marriage did not take place till towards the close of the following year. Sir James Stirling of Keir, already noticed as the colleague of Sir Archibald Napier in the office of justice-depute, and who was knighted at the same time, represented one of the oldest and most respectable baronial families in Scotland. His place of "the Keir," celebrated both in history and song, joined the Napier estates in the Menteith, and was finely situated for astronomical purposes. *

Almost immediately before his son's marriage, Sir Archibald had take a second spouse to himself in Elizabeth Mowbray, a cousin of his own, and a daughter of John Mowbray of Barnbougall, who represented a distinguished and well-known family of Norman extraction. † It is curious to observe that these double *noces* in the family of the philosopher occurred at a time when their residence in the Lothians was literally invested with fire and sword. Their old fortalice became from its situation the very centre of "the Douglas wars," which ravaged the metropolis for a few years after the death of the Regent Murray. These had just commenced when John Napier returned from abroad, driven home probably by that state of affairs on the Continent which led to the massacre of

* Shortly before the battle of Sauchie Burn, the Prince of Scotland (James IV.) was routed by his father's forces near Stirling, and took refuge in the Keir. He was driven out, and the place burnt to the ground by his pursuers. When he gained the throne, he granted new charters of all the lands to Sir William Keir, whose writs had been destroyed, and also L. 100 to "Schir Wilzeam of Stirling, to the bigging of his place."—*Treasurer's Accounts*, 1488. *Mag. Sig.* xii. 64.—Sir Walter Scott thus celebrates the Keir in the Lady of the Lake:

> Blair-Drummond sees the hoofs strike fire,
> They sweep like breeze through Ochtertyre;
> They mark just glance and disappear,
> *The lofty brow of ancient Keir.*

† See Note E.

St Bartholemew. Upon the 2d of April 1572, he and Elizabeth Stirling sign a deed *at Merchiston* preliminary to their marriage. * Upon the 5th of the following month, before the marriage was completed, " the company of Edinburgh," says a contemporary journalist " past furth and seigit Merchistone, quha wan all the partis thairof except the dungeon," &c. †

A glance at the state of the times, as affecting in particular our philosopher's domestic comfort during the period when he was commencing his labours to immortalize his country, will afford an interesting idea of that intellectual power which no dangers could deter, or difficulties turn aside from its victorious path.

" A new civil war," says Spotswood, " did then break out [1571] which kept the realm in trouble the space of two years very nigh, and was exerced with great enmity on all sides. You should have seen fathers against their sons, sons against their fathers; brother fighting against brother; nigh kinsmen and others allied together as enemies seeking one the destruction of another. Every man, as his affection led him, joined to the one or other party; one professing to be the *king's men*, another *the queen's*. The very young ones scarce taught to speak had these words in their mouths, and were sometimes observed to divide, and have their childish conflicts in that quarrel. But the condition of Edinburgh was of all parts of the country the most distressed. They that were of quiet disposition and greatest substance being forced to forsake their houses; which were, partly by the soldiers partly by other necessitous people who made their profit of the present calamities, rifled and abused." ‡

Two notable examples of " quiet men," whose high characters and substance would have made them very acceptable to either faction, was Sir Archibald Napier, and his immediate neighbour in the Lothians, Fairley of Braid. Like Merchiston, the laird of Braid was a staunch friend to the Reformation, but not one of those of the church militant who were leagued with factious and grasping violence. John Knox, when the infirmities and disappointments of his latter days had subdued the rude spirit of his prime, and indeed on his deathbed, turned to Fairley with this affecting speech; " ilk ane biddis me gude nyght, but when will ye doe it; I have bene greatlie behaudin and indebted unto you, quhilk I can never be able to recompence you, but I comit you to one

* See a fac simile of those autographs attached to the etching of the portrait of Elizabeth Stirling; and the Preface for a notice of the deed.

† The Pollock MS.

‡ History of the Church.

who is able to doe it, that is, to the eternal God." * The faithful servant and secretary of Knox, Richard Bannatyne, has left a journal of the transactions in Scotland during the contest betwixt Queen Mary and her son. From his original descriptions we may cull a picture of the scenes enacted at the very gates of Merchiston and Braid, during the period of the philosopher's courtship. I am not certain, however, whether it be himself or his father who is mentioned in what follows. "Fryday the 25 May (1571) a doosane of suddartis come to Braid at supper tyme, and spoyled the myllaris house, the miller beand at supper with the lard; and when they saw the miller cuming in and staying them fra spoyling his house, tuik him and brought him to the yeat of Braid, and gave the lard injurious wordis, bidding him come out to Captane Melving, or elis they suld burn the hous about his luggis. The lard *being a quyet man*, bad thame depart, saying that he had nothing to doe with thame, and gif Captane Melving wald have had him, he had not sent sic messengeris as they were. They still continewing in thair injurious wordis, and misusing the lairdis miller before his eyes, the lard went foorth with a two-handit sword, (the rest of his be occasione hinderet followeth as they myght,) the suddartis, I say, for the most part of thame discharges thair hagbutteris at the laird, but be Godis providence he escaped their furie, and straik ane of them breadlinigis with his sword to the eird, wha cryed that he wald be tane. Uther two of thame having their pieces undischarged, in ane of the which there was thrie bulletis, and seing ane of thair marrowes dung to the grund, they discharge bayth at the laird; yit be Godis eternall providence he was so preservit that he gat no hurt, nor nane of his, albeit they were all but † armour; bot the skeath fell upon themeselvis, for they slew their awin man that had renderit himself to the laird; uther thrie also was tane, before whom this man confessit that his awin marrowes slew him, for the lardis company never schot a schot, and so the suddartis when they had discharged thair pieces fled to the toun, and made report that the Laird of Braid had a cumpany of men of weir waiting thame. So the alarume struk, and all come furth to the querrel holes, bot hearing the treuth, *were stayed be the Lard of Merchinstone*, wha schaw Captane Melving that there were uther men cuming from Dalkeyth for the lardis releif, as that they did with speid." ‡

* Bannatyne.

† *i. e.* without. The immediate sequence of the word *bot* affords a good instance of the distinction as the language then stood.

‡ Bannatyne's Journal, pp. 172, 173, 174. Printed from the original MS. at Edinburgh 1806; and edited by J. G. Dalzell, Esq. The Laird of Merchiston mentioned above is not unlikely to have

MERCHISTON CASTLE

But it was impossible for Sir Archibald himself to remain long unmolested. The most important place in the neighbourhood was his own dwelling, as yet may be seen from the strength and simplicity of its structure no less than its commanding position. It formed the key of the south approach to Edinburgh which the king's party were endeavouring to reduce to famine; nor was it to be expected, that, amid such brawls, even the gently disposed inhabitants of this fortalice would be suffered long to enjoy scientific pursuits within its walls. Sir Archibald's name occurs in none of the reciprocal decrees of forfeiture which both parties fulminated against each other from their respective Parliaments, and in which the Bishop of Orkney is so conspicuous; yet he seems to have fallen under the displeasure of the queen's party at this time, probably because he took no active share in the civil war. The Pollock MS. bears, that, "upoun the 18 day of the said moneth," (July 1571,) "Naper of Merchingstoune, Knycht, wes tane, and brocht to Edinburgh Castell be the Laird of Mynto and his cumpany." Another old historian, after narrating the death of Lennox and the appointment of Mar in 1571, adds, that Sir William Kirkcaldy, who commanded the castle, bombarded the house of Merchiston with iron balls from his great guns, because certain soldiers, hirelings of the king's party, occupied it, and intercepted the provisions coming to the castle and town.* Thus it would appear

been the philosopher, who was frequently styled Laird of Merchiston, (of which barony he was in fee) before his father's death. Sir Archibald was generally called of "Edinbellie" and "Knycht." This "Captane Melving" was clearly one of the eight sons of Helen Napier and Sir John Melville of Raith, who were all devoted to Queen Mary. He was consequently the cousin-german of Sir Archibald. Very shortly after the incident in the text, Melville was blown into the air by the igniting of a barrel of gun-powder which he was in the act of dealing out to his soldiers on Craigmillar hill. There was great lamentation by the queen's party for his death. All the nobility followed him to his grave, over which his nephew Grange pronounced a funeral oration to his soldiers. His brother David Melville was placed in his command. He is not mentioned in the peerage (Leven and Melville,) but these facts may be gathered from a comparison of the contemporary journals of Bannatyne, Sir James Melville, and the Pollock MS.

* "*Ecclesiæ Scoticanæ Historia per Archibaldum Symsonum*," *&c.—MS. Advoc. Lib.*

The words are, "Gulielmus Kirkaldy arcis præfectus, tormento majori ferreis globulis domum Merchistoniam oppugnat propterea quod conductitii milites a Regis partibus ibi residentes viatica, unde arx et oppidani alantur, intercludant."

Nor had the paternal house of John Napier's spouse escaped the consequences of the times. After the battle of Langside, the privy-council of the Regent issue letters charging certain barons

that Grange entertained his cousin Sir Archibald, when under his custody, with the agreeable pastime of battering the family fortalice. Barnbougall, the paternal house of Sir Archibald's spouse, was about the same time suffering under the tyranny of the worst civil war that ever ravaged Scotland. At the commencement of the year 1572, the Laird of Dundas was entertaining at his castle in the neighbourhood of Barnbougall, Sir Richard Maitland of Lethington and his lady. Notwithstanding the presence within its walls of so staunch a queen's man as "auld Maitland," that faction had determined to become masters of the castle of Dundas; an attempt which seems to have emanated from Grange, ever fertile in such enterprises. Robert Mowbray, the eldest brother of Merchiston's lady, undertook to execute the dangerous project in the following manner: He obtained from Edinburgh thirty mounted soldiers, who were placed in concealment under a bank near the iron gate of Dundas. Two men disguised in ragged garments, with pistols under them, lurked close to the gate, while Mowbray and a comrade, also disguised and armed, took up their stations in a house in the village of Dundas, close to the place. It happened, however, that one David Ramsay, the Laird of Dundas's servant, went down to the village "to get a morning drink," and entered the very house where Mowbray and his comrade were on watch. The result of Davie Ramsay's early potation was, upon this occasion at least, fortunate for his master. He detected the adventurers under their disguise, and instantly started off to give the alarm, pursued by Mowbray and his comrade, who fired their pistols at him without effect. The enterprise failed; and Sir John Mowbray, in consequence of his son's participation, was summoned before the Regent and privy-council, confined in prison for two or three days, and only released upon finding security that he would not suffer "the rebelis" (*i. e.* the queen's party) to occupy his castle of Barnbougall as a garrison. Not satisfied with this, however, the Regent occupied the place with soldiers of his own, and again committed the laird to confinement in the town of Ayr.*

to yield up their strongholds to the bearers of the letters "to be kepit be thame, and to devoid and red thamesellis, thair servandis and gudis, furth of the samyn, within sex houris, under pains of treason;" and this for holding them for the queen: "That is to say, Andro Hamiltoun of Cochno, the tour and fortalice of Cochno," and after many others, "James Striueling of Keir, the house and fortalice of Keir. The said James Striueling of Keir, the tour and fortalice of Cadder," &c. Merchiston is not mentioned.—*Original Privy-Council Record.*

* Bannatyne's Journal.

About this time the English ambassador, Sir William Drury, went a progress through Scotland to visit the strongholds of the king's party, and in pursuance of his advice, the Regent Mar, whose humane and gentle dispositions soon sunk under the policy he was constrained to pursue, endeavoured to reduce the town of Edinburgh to absolute famine. With this view, " the regent and the kingis favouraris stuffit," (*i. e.* garrisoned,) " the houssis of Craigmillar, *Merchingstoun*, Sclatfurd, Reidhall, Corstorphine, and the college thairof, and the abbay, with all places about the town of Edinburgh."—" And also all inhabitouris within twa myles to Edinburgh wer constranit to leave thair houssis and landis, to that effect Edinburgh sould have na furneissing, and damnit poore men and women to the deid, for inbringing of victuallis to Edinburgh." * Sir Archibald Napier seems to have been released from his durance in the castle of Edinburgh, and to have escaped forfeiture. He had retired probably to his estates in the Lennox or Menteith, for in the same contemporary journal I find it recorded, that " upoun the 3d day of July (1572) Archibald Naper of Imbillie (Edinbellie), knycht, wes summoned to have compeirit befoir the quenis lieutennentis and hir counsall, the 6th of this instant, under the pain of rebellioun and putting of him to the horne." Thus was he, —as his brother-in-law wrote to him a few years before,—" sett amiddis betwix twa grete inconvenientis ;" for the king's faction in 1568 kept him prisoner in his own house under heavy securities; in 1571 the queen's faction sent him to Edinburgh Castle for not remaining in the vicinity of the town; and having been in 1572 again compelled to seek refuge or peace elsewhere, he was summoned by the queen's lords to compear before them at the very time the king's lords had filled his mansion with soldiers, and surrounded it with fire and sword. These factions had indeed made his house too hot to hold him; and Merchiston was at this time no retreat for the lovers of mathematics and alchemy, or for those who only sought its battlements to consult the stars.

Upon the 5th of May 1572 the queen's troops issued from the town to besiege Merchiston. After a desperate struggle they made themselves masters of the outworks, and finally of the entire castle, with the exception of its " donjon keep," to which the regent's garrison had retreated as a place impregnable. The besiegers followed up their advantage with the most determined ferocity. Finding it impossible otherwise to dislodge their enemies, they set fire to the

* The Pollock Manuscript.

out-houses, " thinking to have smokit the men of the dungeon out;" but the king's party in Leith, well aware of the importance of this fortalice, marched in great force to raise the siege. The guns of Edinburgh Castle commenced to play upon these new assailants, and fired more than forty shots to cover the besiegers, who were commanded by one Captain Scugall. But nothing could resist the charge of the Laird of Blairwhain, who drove the queen's cavalry back into the town,—his own horse being shot under him. Captain Scugall was mortally wounded. Among the incidents of this skirmish, " ane canone bullet dingis the revell, the spurre, and the heill of the sock and hois of ane of the horsemenis leggis without stirring the hyde."

Upon the 10th of June following, most of the horsemen and soldiers in Leith (the king's faction) laid siege to the castle of Nydrie Seytoun; and upon the same day the entire disposable force in Edinburgh, with as many of the townsmen as were for the queen, and a small train of artillery, all led on by George Earl of Huntly, made another desperate attempt to win the castle of Merchiston. This had nearly succeeded. The assailants battered its gray walls with their cannon; while their cavalry, scouring the fields to the south betwixt the fortalice and the hills of Braid, brought in forty head of cattle and sheep. The siege commenced at two o'clock in the afternoon, and the cannon played upon the tower until four o'clock; and, says the old chronicle, " maid greit slappis in the wall; quhairat the keiparis of the said place being bot * men, and the principal commander absent, unbethocht thameselffis that they wer nocht of possibilitie to detene it fra thair said adversaris. Ane of them, nameit Alexander Felde, souldiour, be advyce of the remanend, seing ane of his broder slane, past to the wall heid benevolentlie to have randerit the said place," &c. provided the Earl of Huntlie would allow the garrison to march out with the honours of war. In the midst of this parley, however, a large body of the country people, attracted towards the scene of action by the noise of the guns, but more from curiosity than any intention of siding with either party, impressed the besiegers with the idea that they were menaced by the forces of the regent. They instantly sent back their battering train into the town, which arrived in safety; but the regent's party, issuing from Leith, overtook the queen's forces, and the result is thus given by the journalist, who seems to have been one of the besiegers. " *We* ruchit on thame, and incontinent thairefter gaif bakis and fled, castand thair wappinis fra thame for haist to win the town of Edinburgh, all because thair wes sum of the horsemen wes come with my

* This blank occurs in the Bannatyne print of the Pollock MS.

Lord Mortoun fra Nydrie to the said effect. Thair wes sum slauchter on baith syddis; four of Leith and five of Edinburgh, with fifteen burgessis and craftismen of Edinburgh tane to Leith, and twa of Merchinstonis suddartis tane. The leiving of the hous of Merchingstoun wes Capitane Hew Lauder, callit serjand majour; because the capitane thairof mariit the said Hew his sistar; and als wes suspectit of the skaith the town gott at this chaiss, becaus he promittit in hechting to caus the town men doe or die; bot he wes hurt at this chaiss; and als George Erle of Huntlies horss wes slaine under him be ane schote that come out of the palice of Halyrudhous." A conflict yet more bloody occurred at Merchiston on the last day of the same month. A party of twenty-four mounted soldiers had been sent to forage for the town, which was nearly reduced to famine. The well-stocked fields in the neighbourhood of that fortalice were the constant scene of enterprise; and upon this occasion the foragers collected many oxen, besides other spoil, which they were driving triumphantly into the town. They were pursued, however, by Patrick Home of the Heucht, who commanded the regent's light horsemen. The foraging party, whom hunger rendered desperate, contrived to keep their pursuers, amounting to four score, at bay, until they were passing the gate of Merchiston, when the regent's garrison issued forth and drove back the cattle. The Edinburgh horsemen instantly alighted from their horses, which they suffered to go loose, and "faucht creuallie." A strong body of infantry quitted the town to support this brave little band, and turned the fight in their favour. All the loss fell upon the party of the regent; Home of the Heucht their leader, Patrick Home of Polwarth, besides four other gentlemen, were killed. Of the queen's party a few were wounded, and only one foot soldier lost his life, who was killed by a shot from the battlements of Merchiston. *

Very shortly afterwards a truce was effected betwixt the contending factions. The French and English ambassadors used some exertions to put an end to the savage and unnatural warfare which desolated the heart of Scotland, and threatened Edinburgh with absolute destruction, from the number of houses that were daily pulled to pieces for fire-wood. Their influence, cordially aided by the good Earl of Mar, brought about a cessation of hostilities for two months from the 1st of August, which was agreed to, and signed by each party, at Leith and Edinburgh, on the last day of July 1572.

* The Pollock MS. pp. 264, 299, 300, 303. For these sieges see also Historie of K. James Sext, and Bannatyne's Journal.

To the propositions in this armistice, "What persons were meetest to convene on either side, during the time of the abstinence, to treat upon the pacification, and in what place and order, it was answered, that the meeting should be on the Gallowley, the Earl of Morton with the Earl of Huntlie, the Lord Home with the Lord Ruthven, the Abbot of Dumfermling with the Prior of Coldinghame, the *Bishop of Orkney* with the Bishop of Athenis," &c. *

Sir James Melville narrates, that, shortly before the death of the Earl of Mar, a strenuous endeavour was made to accommodate matters with the noble and disinterested Grange, so as to reconcile the interests of the queen and her son. Grange demanded only that every man should be allowed to retain his own, and that Mar should cause certain debts to be paid, which had been contracted for repairing the castle and its great guns; "Quhilk conditions," says Melville, "the regent promysed to fulfill, and to be ane assured frend to Grange, and them of the castell in particulaire; and without any further cerimonies, callit the Lard of Tullibarden his gud brother before, and efter that he had declaired unto hym how far we had proceadit, he choppit his hand in myn, and swore the paice in presence of the said lard; who had also been a good instrument to the said agrement, togither with his man of law, Maister Clement Litle, a very honest man, brother to Willyem Litle, efterwart provest of Edinbrough. Na ma were made prevy thereto, bot my Lady Mar and Capten James Kuningame." The regent went afterwards to Dalkeith, where he was banqueted by the Earl of Morton. "Schortly efter, he tok a vehement seaknes, quhil caused him ryd to Stirling sodanly, wher he departed this life, and was regreted of many. Some of his frendis, and the vulgair people, spak and suspected that he had gottin wrang, and others, that it wes for displeasour." He died on the 29th October 1572.

Morton, the mortal enemy of his queen and of all who espoused her cause, or had compassion on her state, succeeded Mar in the regency. The castle of Edinburgh was the only remaining stronghold of the queen's party. There the few friends that continued devoted to her, and who looked forward with sanguine hopes to the adjustment of an amicable policy betwixt her and the young king, still maintained that honest and determined bearing which opposed a formidable barrier to the schemes of Morton. It was chiefly with the cousins of Merchiston that the new regent had now to deal. Grange commanded the castle, and with him were his brother James, and his ne-

* Bannatyne's Journal, p. 347.

phews Sir Robert and Sir Andrew Melville. These, with the Lord Hume and the Secretary Lethington, were the leaders of that small but illustrious band of patriots, who, in the castle of Edinburgh, vainly struggled to break the toils which the dark Morton was drawing around them. Nor did Sir James Melville, at this fearful crisis, forsake his relatives. Ever active in the cause of justice, peace, and humanity, he laboured, though fruitlessly, to negociate betwixt the regent and the queen's party in the castle, to which place Morton, backed by an English army under the conduct of the marshal of Berwick, and assisted by all Scotland, now laid siege. Grange declared he would keep it against the world, with the aid of eight persons, "of the quhilk nomber," says Melville, "the Lord Hum wes ane, my twa brether, Sir Robert and Androw, the Lard of Pittadrow, and his brother, Patrick Echlin." But the usual fate of a devoted garrison awaited them. Their provisions failed, and their draw-well became dry. That without the walls, to which men were let down over the rocks by cords from the ramparts, was poisoned by the enemy; and at length Grange was forced to capitulate. The marshal of Berwick, Sir William Drury, being his warm friend and great admirer, no fears were, in the first instance, entertained for his personal safety. The leaders of the garrison, allowed to go forth with all their arms, were for three days at large. Grange and Lethington took up their abode with Drury, who had earnestly stipulated for the safety of the former. Sir Robert Melville went to his own residence, where he was joined by his brothers. But Morton's revenge was unsatiated. He prevailed with the Queen of England to send her commands to her marshal to deliver up Grange and the secretary, "quhilk he durst not disobey, bot delyverit them, with gret regret, be raisoun of his promyse, and returnit malcontent to Barwik." * The secretary, crippled with gout and other bodily infirmities, died almost immediately at Leith, "some supponyng he tok a drink, and died as the auld Romanes wer wont to do." † But Grange was reserved for a fate yet more cruel. In vain had Drury pledged his own honour for his life; in vain did a hundred of his kin offer suit and service to Morton, and a yearly pension of three thousand merks, if he would spare Grange. He was executed, with his brother James, like a common felon on the Castlehill. Having escaped the gibbet for a deed of his youth which richly merited such a fate, he was doomed to that ignominious death, after a career of arms that rivalled the chivalry of Europe, for fidelity

* Melville's Memoirs. † Ibid.

to his trust and devotion to his queen. With this relative of our philosopher fell the last hopes which enlivened the captivity of Mary. *

Sir Archibald Napier and his illustrious son were too earnest in the Protestant cause to be devoted to a Catholic queen. But the relics and reminiscences of poor Mary, which are preserved in the family of Merchiston,—the little quaint panelled closet there with its vast depth of window, still called Queen Mary's bed-room,—and above all, the long-cherished portrait, taken before sorrow had reached her,—are all touching indications that the house of Merchiston contained none of those factious rebels who dared to tell their sovereign that her " life was the death of the church, as her death would be its life." While Sir Archibald and John Napier were both studiously removed from either faction, their attention must have been constantly attracted by the connections we have traced, to the treatment which the queen experienced ; and even after her exile, those connections continued to subsist to the last hour of her captivity, and under circumstances that must have called forth their deepest sympathy. Of the *eight* sons of Helen Napier, who were all queen's-men, the three most distinguished were Mary's confidential and affectionate advisers at three distinct periods of her career. Sir James Melville, though he never forsook her, is more particularly identified with her story while she was yet a queen. Sir Robert was the friend upon whom she leant at the fearful crisis of her abdication ; and now, in her captivity, she reposed with equal confidence upon Sir Andrew Melville, who, after the fall of his nephew Grange, had joined her in England, and became master of her household. But in that melancholy household other near relatives of Merchiston were domesticated. It has entirely escaped our genealogical writers, that Sir John Mowbray of Barnbougall and his lady, the sister of Grange, had two daughters named Barbara and Giles, who were younger than their sister Elizabeth, the stepmother of our philosopher. Barbara, the eldest of these two, was only eight years old when the queen fled to England ; consequently, neither of them could have accompanied her at that

* Sir James Melville says, that King Henry II. of France commonly chose Grange on his side at their sports, " and because he schot faire with a gret schaft at the buttis, the king wald have him to schut twa arrowes, ane for his pleasour; and the Gret Constable of France wald not speak with him oncoverit."—" He (Grange) wes humble, gentill and meak lyk a lamb in the house, but lyk a lyon in the feildis; a lusty, stark and weill-proportionate personage, hardy and of a magnanyme curage," &c. p. 257.

From the Original Portrait in possession of the Lord Napier.

Vostre tres humble et tres obeissante fille
Marie

time; but they both joined her afterwards, and never left her in her captivity till death parted them. Perhaps they had accompanied Sir Archibald Napier, who went into England upon some royal mission in the year 1580, as appears from the following item in the high treasurer's accounts:— "May 1580. *Item*, be the kingis grace precept to the Laird of Merchainstoun, for defraying of his chargeis maid in his preparatioun for his jorney in England, as the said precept and his acquittance apoun compt beiris, L. 400." This was a large sum, and indicates the mission to have been one of dignity; but I cannot find Merchiston on any of the embassies of that period noticed in history, or by contemporary chroniclers. It is not impossible, however, considering his relationship to Lady Mar and the Melvilles, that he may have been sent on some errand from the young king to Mary in England, and have taken along with him his two sisters-in-law. Certainly, James owed his mother at this time a message of kindness. It was upon the 17th June 1579, that she had sent her French secretary Nau with letters and presents to her son, particularly a vest richly embroidered by her own hand. But this messenger was not allowed to obtain an audience; and was harshly and unceremoniously dismissed, because his credentials were only directed to the Prince of Scotland. Be this as it may, the Misses Mowbray were still attendant on the person of Queen Mary, and Sir Andrew Melville still her master of household, when the Babington conspiracy was made the pretext for putting her to death. Connected with their history, we must also mention William Curle, Mary's favourite secretary, and Jane Kennedy, her favourite maid of honour. During their long and affectionate service, attachments had sprung up among them, which were evinced by the marriage of Sir Andrew Melville to Jane Kennedy, and of Barbara Mowbray to William Curle. Before these unions, however, their mistress was no more; and we must notice the termination of her life, to mark the interesting parts which Merchiston's relatives enacted in that closing scene.

When the Queen of Scotland was condemned to die, her son James felt, or affected the utmost extremity of grief and indignation. After some negociations, in which the sincerity of his feelings are not very apparent, he despatched two ambassadors, who were understood to be intrusted with the most peremptory demands for the life of Mary. They were totally opposed, however, in their characters and conduct. The one was that old friend and faith-

ful adviser of the queen, Sir Robert Melville; the other was the Master of Gray, her insidious enemy, and the friend of her son. This degenerate young nobleman either betrayed his public trust, or fulfilled his secret instructions too faithfully. "The dead cannot bite" was the diabolical phrase with which he qualified his remonstrance. Not so Melville. At the risk of his own life, he followed the dictates of honour, courage, and humanity. "My brother," says James Melville, "spak brave and stout langage to the consaill of England, sa that the quen hirself boisted him of his lyf; and efterwart had bene retenit captyve, wer not the credit that his collig had, and the promyses that he had maid, wherby they wer baith sufferit to com hame togither." Crushed by her rival, and betrayed by her son, Mary, with the most serene dignity, prepared to meet a fate which the same writer has characterized in three words, "that unkouth, unkyndly mourther." * On the morning of the execution, while the queen was on her knees at the altar, Barbara Mowbray, and a young French lady of the name of Beauregard, complained to her physician Burgoin, that their names had been omitted in her will, (which the queen had hastily drawn up with her own hand,) and with tears entreated him to tell her so. No sooner was Mary informed of their affectionate complaint, than she rose

* Melville would never have used these strong expressions of sympathy for Mary, and execration against Elizabeth, had he believed the former guilty of the murder of Darnly. Throughout the whole of his Memoirs he speaks of her in the most affectionate terms, totally inconsistent with a belief in her entire abandonment of character. He expressly says, that Tullibardine, Grange, and others, *bore great love* towards the queen, and were only in arms for the safety of the prince, and the punishment of the king's murder; and that they sent him, Melville, to the Regent Murray, to entreat him in their name, "to bear him gently and humbly unto the quen."—P. 193. He also says, that Bothwell treated Mary so inhumanly after he had her in his power, "that Arthour Askin and I being present, hard her ask a knyf to stik hirself, or else, said sche, 'I sall drown myself.'" This he narrated to Sir James Balfour, and told him to keep the castle of Edinburgh, "and to be that gud instrument to saif baith quen and prince, and *to persew the Erle Bodowell for the kingis mourther.*"—P. 180. While he speaks of that "*foull mourther of the king*," he calls Mary "*that gud princess.*" Is it possible, then, that Sir James M'Intosh could have read these Memoirs, when, in his History of England published 1832, he says, "Of Mary's friends, the most experienced and sagacious was Sir James Melville,—true to his queen, but not a slave to state,—who, of all the writers of that age, has made the nearest approach to impartiality? Though he was too *honest* to deny the queen's share in the death of her husband, his conviction, which was proved sufficiently by his silence, did not extinguish his loyal attachment." —P. 88.

from her kneeling posture, and remedied the omission by writing a remembrance of them upon the blank leaf of her book of devotions. *

But one of the most affecting scenes was what past betwixt Mary and Sir Andrew Melville. On her progress to the scaffold he was permitted to accost her once more, and it was to him that Mary's last solemn and sustained speech was addressed. Melville, in an agony of grief, lamented the sad tidings he would have to return with to Scotland. "Rejoice rather than mourn," said she, "that the woes of Mary Stuart are about to cease. Know you not, Melville, that all this world is vanity,—full of trouble and misery. Return with these tidings, that I die a Catholic, true to my religion,—a Scotchwoman, but true to France. God forgive those who have thirsted for my blood. He who knows our secret thoughts, knows that mine ever sought peace, and the union of the realms. Remember me to my son, and tell him that no act was ever done by me derogatory to my kingdom and the crown." She then reclined over Melville, and kissed him, while tears fell from her eyes. "And so," said she, "good Melville, farewell. Once again, farewell, good Melville, and grant me your prayers." † Her next request was that her own attendants might see her die; and having with difficulty obtained leave to select a few, she chose Melville to support her train to the scaffold, her physician Burgoin, and from among her maidens, Jane Kennedy, afterwards the wife of Melville, and Elizabeth Curle, the sister of her secretary. These ladies attended her on the scaffold; and when the fatal moment approached, Jane Kennedy bound an embroidered handkerchief about the eyes of her beloved mistress, and received her last kiss. ‡

After her death, the household of the Queen of Scots were treated with great harshness and cruelty. These forlorn domestics humbly prayed to be allowed to depart to their respective abodes. They were detained, however, as prisoners, and kept in constant dread of death or torture, with food barely sufficient to sustain them. None of them were suffered to take exercise, or move without a guard. During these tyrannical proceedings, Barbara and Giles Mowbray, the affectionate companions of a queen, and the daughters of one of the oldest baronial houses in Scotland, young and irreproachable in their conduct, were cast into prison. This inhuman step brought matters to a crisis. Sir Archibald Napier's father-in-law complained to his own sovereign of this cruelty, and obtained the royal commission to proceed to London for the re-

* *La Mort de la Royne D'Escosse.* 1589.

† Ibid. ‡ Ibid.

lease of his two daughters, and of all her late majesty's domestics.* About the period of this mission, information had been sent to Elizabeth by those who were weary of guarding the body of Queen Mary and tyrannizing over her servants, that the embalming had been insufficient, and that part of the leaden coffin had given way. Her own dissimulation, added to the opportune arrival and strong remonstrance of the Laird of Barnbougall, at length determined Elizabeth to order the remains of her rival to be interred at St Peterborough with the pomp suitable to royalty. In the same curious contemporary tract from which these details are obtained, it is recorded, that in the heraldic pageantry, " Les femmes de la Royne d'Escosse" walked in the following order. " *Madamoyselle Barbe Maubray.* Christine Sog. *Gilles Maubray.* Elspeth Curle. Rence de Realay. Marie Pagets. Janne Kennedy. Susanne Korkady." † Very shortly afterwards Jane Kennedy was united to Sir Andrew Melville, and Barbara Mowbray to William Curle. This faithful secretary had acted in that capacity to Queen Mary for more twenty years; that is before her captivity commenced. His extorted evidence had partly been made an excuse for her condemnation, which greatly afflicted him; and many a time his sister Elizabeth used to fall on her knees before the queen, and in an agony of tears implore forgiveness for her brother. ‡ One of Mary's latest requests to the Earl of Kent, rendered more earnest, perhaps, by her knowledge of the affection which subsisted betwixt her secretary and Barbara Mowbray, was that William Curle should be suffered to depart in peace. The Earl pledged himself for his safety; and, accordingly, not long after the solemn interment at St Peterborough, Curle with his spouse and his sister Elizabeth,

* See Note E.

† " *La Mort de la Royne D'Escosse,*" printed 1589; reprinted by Jebb in his Collections, v. ii. p. 611. This account, which is extremely minute and curious, appears to have been written by one of her household,—probably her physician Burgoin. " Prenez," says the writer, " en bonne part je vous supplie, la grande affection et juste regret d'un serviteur fidele, et de bonne volonté, qui ne peut endurer que l'honneur de sa maistresse soit foulé on offencé," &c. He also narrates, that when the royal procession had reached the chapel, and the service had begun in English, Burgoin and the other domestics of her late majesty rushed out of the chapel, with the exception of Sir Andrew Melville and Barbara Mowbray.

‡ Mary always exonerated William Curle, whom she loved; and accused Nau, the French secretary, of misleading him, and being instrumental in her death. Gilbert Curle, the brother of William, was also of her household in her captivity, and a married man, as Queen Mary in her will mentions Gilbert Curle's wife.

turned their backs for ever on the shores of Britain, and sought security and consolation in a Catholic country.

I know not what became of Giles Mowbray, who probably returned to Scotland with her father. As for Barbara, it is a curious fact that some time in last century, a Flemish gentleman of talent and consideration in the Low Countries possessed an ancient Flemish manuscript, which narrated that William Curle, accompanied by two ladies of the same name, came over to Antwerp after the execution of the Queen of Scots, carrying with them a picture of that unhappy princess, and *her head* which they had contrived to abstract; that in the little church of St Andrew there, they buried this fearful relic at the foot of one of the pillars where their own tombs were to be, upon which pillar they hung the picture of their queen, and placed a marble slab to her memory. Thus far the Flemish manuscript. Whoever visits that little church may still see upon the pillar that self-same picture of Mary Queen of Scots, and read the inscription which records her martyrdom. He will also find beneath it the tombs of Barbara Mowbray and Elizabeth Curle, and may peruse their story engraved upon the slabs that cover their dust. *

The fate of Jane Kennedy was yet more melancholy. After her union to Melville, they were both in the highest favour with James VI., and when that monarch in 1589 was arranging the preliminaries of his marriage, Sir Andrew was his master of the household, and the lady whom he selected to be about the person of his queen was Sir Andrew's spouse. But she who had so affectionately shrouded the eyes of Mary at the block, was not destined to wait upon the mother of Charles I. When she received this high mark of her sovereign's confidence, she was residing in Fife, and nothing could deter her from instantly crossing the water, though the storms were so great as to be considered the effect of a combination of witches against the royal alliance. The result we shall give in the words of Sir James Melville. "The stormes wer also sa gret heir, that ane boit perissit between Brunteland and Leith, wherin was a gentilwoman callit Jane Kenete, wha had been lang in England with the queen, his majestei's mother, and was sen-syn maried upon my brother, the maister houshald to his majestie, Sir Andro Melville of Garvok. Quhilk gentilwoman being discret and grave, was sent for be his majestie to be about the quen his bed-fallow. Sche being willing to mak deligence, wald not stay, for the storm, to saill the ferry; when the vehement storm drave a schip

* See Note E.

forceably upon the said boit, and drownit the gentilwoman, and all the personnes except twa. This the Scotis witches confessit unto his majestie to have done."

Having recorded the various coincidences which form such interesting links between the annals of our philosopher's house and kindred, and the eventful history of his times; and especially the circumstances, which must have called his attention, and, all-protestant though he was, attracted his sympathies to every step in the fate of Mary of Scotland; we must now follow more exclusively his own personal history.

CHAPTER IV.

ALTHOUGH it was impossible for John Napier entirely to withdraw himself from the numerous connections that linked him to public events as well as to social life, yet he lived aloof from the court and its intrigues, which can scarcely be said of any laird or lord of Merchiston except himself. There was, however, no austerity in this mode of life. Retirement was to him a matter of necessity, unless he had forsaken his scientific pursuits; but I cannot discover, though such is his popular character, that he possessed either the temper or the habits of a recluse. In the midst of his most profound meditations he was ever open to the demands of others upon his time, and "singular judgment." When, as we shall find, the General Assembly of the church wished to overcome king James, they sent John Napier at the head of a mission from which the sturdy school of Knox held themselves excused. When King James's courtly lawyer, Sir John Skene, met with a word whose signification required more than ordinary talent to elucidate, he selected John Napier from among all the learned of a learned age to frame answers to his queries. When tidings came from the enchanted palace of science at Uranisberg, how Tycho and his satellites, Longomontanus and Kepler, had been groaning under the tyranny of Logistic, their grievances were submitted by a mutual friend* to this Scottish oracle, who returned them for response *a promise of the logarithms*. The learned Robert Pont would seek his aid to disclose the times of a prophetical text; and the stormy Robert Logan crave his "ingyne," to discover a hidden treasure at Fastcastle. In his own family he was equally respected, and consulted upon all occasions. He was his father's right hand in parish business and family affairs. While the knight was engrossed with searching for gold in the Pentland hills, operations of which we shall afterwards take a view, his illustrious son was frequently burdened with the charge of the

* *Dr John Craig.*

family estates. Besides agricultural and other ordinary occupations, we shall have to contemplate him, one while drawing the horoscope of an infant brother, and again, framing an elaborate epistle to reclaim an unruly one.

The following letter to his father, which had hitherto escaped observation among the family papers, affords an admirable illustration of the unaffected simplicity of the philosopher's character, and the kindliness of his disposition. It is not dated by the year in which it was written; but it bears internal evidence of a date somewhere betwixt 1580 and 1590.

" To the Rycht Honorable and his belovit Father, Schir Archibald Neper of Edinbelly, Knycht.

" Rycht Honorable Schir and Father, efter my hairtlie commendatione.—Your tryst apoyntit befor you to hewf bein keipit be the fewers, beand continuit to Thurisday, we mett at Ogilgirth, but ony appirant mynd that evir thei menit to agrie, for we fand thaim mair onressonable and mair extrem nor evir thei wer of befor; bot the tryst wes apoyntit for na uther cours nor to get us al togidder, that thei mycht the easelier summond us (as thei hewf doine beth) to find lawbouris,* as also hes aristit the cornis and crop by sik forme of letters as ar nocht commone. Ye hewf heir the copie of the chergis of lawburowis; bot we hewff gottin na copie of the aristment; bot heirs that the officer is deput to cheir the sam, and stak the sam upon the grund, upon the expensis of the crop itself, ther to stand ondir aristment til it be decydit; and also hes fensit and aristit the pettis, turris, heddir and fewall castin ther be us; quhereupon ther is certainlie appirans of cummer to fall schortlie betwix thame and our folkis Waltir Grahemis sonis and David Haldaine, onles ther be sum wey devysit and doun ther be you, by chargis that may get the said arristment lowsit upon catione to prowf the landis, quhereon that corn grows, to be ours; for David Haldane and Waltiris bairnis ar determit nocht to find lawbourrows, bot to pass to the horne. As for me, I mynd nocht, God

* " Letters of lawborrow, obtained at the suit of him who is disturbed in his person or goods by another, contain a warrant to charge the party complained of to give security that the complainer shall be kept harmless from illegal violence. The word is derived from *borrow* or *bogh*, an old word for cautioner. The complainer, before obtaining letters of lawborrows, must either swear that he dreads harm from the party complained of, or bring evidence of his malicious inclinations towards him. At first no letters of lawborrows were granted except where one suspected his own life to be in danger; but they were afterwards extended in favour of the complainer's family, and even tenants, that none of them should be troubled in their persons or goods," &c.—*Erskine's Institute of the Law of Scotland*, B. iv. Tit. i.

willing, to mell* with na sik extraordinar doingis; and therfor I prey you, ather yourself, or causs ony of your gudsonis act thamselfis cationeris in the buiks of secrit consal, conforme to this cherg, ondir the painis of 1m [1000] merkis that I sal nocht molest thaim. And this man be done schortlie, for the cherg is upon sax days, and I wes chergit on Thurisday. And I, be thir presentis, binds and oblissis me my airis and executoris to reliss you or thaim that beis cationé for me. Also David Haldane desyrit me to wrett to you to raiss the lyk letteris in al our namis agains thaim al be naim that ar in the copie, anent the lyk lawborrowis, lest quhen ony other man truble that aristment, thei wald truble us, and provok us to contravein our lawborrowis. Of sa smal metteris as the pryce of the letteris I wald nocht say na thing to David; for we man nocht compt sa nerly with him, seing it is apeirant to be derair and mair expensis to him and ilk ane of us heir, nor the expensis of the law. Farder,—Jhone Duglass had neir endit letly with Drumquhassil, anent the vittell ye tuik or the land wes redemit, and suld hewf gottin fra him aucht bollis in hand: the gudman of Cayston hes steyt him, and brocht him to his latter answer, quilk I assur you is four bollis mell of you; yit becauss he is presently in mister, † gef ye think guid to send your precept of twa bollis, I sall do that I mey to get his present discherg, and that metter past danger. Befor the concluding of this letter, Mr Jhone Grahaim, cumming to the Keir heir, schawis me, that the commoun custoum of the Lordis of Session is to gif letters to officers to cheir and stak debetable cropis upon the land quher thei grew, gif that be the first yeir that evir that land wes tillit. Therfor, I think ye suld get suspensione or lowsing of the aristment upon the contrair narratiwf, that beth thair wer staidis of rigs of ald in that land, to manifest that it heth bein tillit of befor, as also that ther ar evidently to be sein staidis of rigs of ald in al pairtis abut that land that Waltir now hes tillit; and that the saming wes of ald tillit be us is notoir, for it lys betwix our hid dyks and the fewairis awin ryding of propertie, as thei red upon thair consciens beand sworn; and that thei hewf na commontie be nath thair ryding is notoir, beth becauss riggis can nocht be commontie, as also we offer to prowf be our evident,

* To mell, mel, mellay. To meddle with, to contend with.—*See Jamieson.*

Rycht peralous the semlay was to se,
Hardy and hat contenyt the fell mellé.—*Blind Hary's Wallace.*

† Mister, myster. Want, necessity.—*Ibid.*

He ete and drank with ful gude chere,
For thareof had he grete myster.—*Ywaine.*

that thair proper merch is al ane with our proper merch, but ony commontie; and by and besyds al this, quilk desolvis thair fals narratiwf, ye sal find catione to recompance thair domnag, incaiss that land be not provin your propertie; and that I will assur you we wil get mest clairly provin, as I shall schaw you at meting. Heirfore, lest upon our honestie we be forsit to assist David and our men in their extraordiner doingis, the causs tending als weil to us as to tham, I prey you do that mey be done by letters, for war nocht I, thei had ellis enterit in cummer.* So referring to your answer and adwertisment of al thir turnis, I commit your m^r^ and yours in the protectione of the Eternall. At the Keir this xx of August,

" Be your m^r^ Sone at command,

" JHONE NEPER."

We pity the philosopher who could travel through this letter, and cry " all is barren." It is a remnant more valuable in reference to the biography of its writer, than if it had been crammed, like the epistolary effusions of Kepler, with the deepest calculations; and we may see from it how justly his character was appreciated by those about him when they adopted that sacred device and legend for his portrait, " wise as the serpent, and simple as the dove." He mentions, that while he was in the act of writing, *Mr John Graham* arrived at the Keir, whom he did the honour to consult with regard to the forms of law, as a person of authority upon such points. It is interesting to trace who this person, thus familiarly mentioned, was; and while his name assists us in fixing the chronology of the letter, his history serves to illustrate the foreboding of our philosopher as to the chances of such patrimonial disputes proving " derair and mair expensis to ilk ane of us nor the expensis of the law." John Graham of Hallyards succeeded to the office which Sir Archibald Napier had held, of justice-depute to the Earl of Argyll, some time before the 12th of January 1579; and at the trial of Morton in 1581, he presided in that capacity. On the trial of Gowrie in 1584, he was appointed justice by special commission; and immediately thereafter, obtained the place of an ordinary Lord of Session in the room of Robert Pont, who was then removed under a peremptory act, incapacitating " all persouns exercising functions of ministrie within the kirk of God to bear or exerce any office of civil jurisdiction." David Moyse the notary, who has left a very curious journal of his times, records, that in June 1590, "The Lordis of Sessioun wer in-

* *i. e.* Had it not been for my exertions they would otherwise have gone to loggerheads.

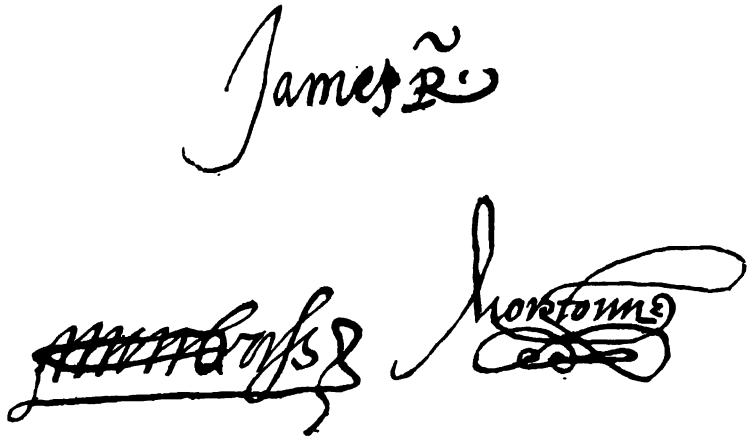
tendit to be altered, and sum accusatioun past betwix Mr John Grahame and Mr David M'Gill, baithe Lordis of the Sessioun, ather of thame accusing utheris of bryberie and kneaverie." * But he afterwards became involved in a matter yet more serious, and which proved fatal to him. The estate of Hallyards consisted of temple lands, which Graham had obtained through his wife, the widow of Sir James Sandilands of Calder. That lady held them upon a title granted by her first husband, whose tenants in those lands had a preferable right of possession. To defeat this, a deed was forged by a notary at the suggestion of William Graham, a brother of the Lord of Session, by which it was made to appear that these tenants had yielded their preferable right; and consequently, they were cast in an action raised to establish it. But the forgery was discovered, and the notary hanged; upon which Mr John Graham raised another action against the minister of Stirling, who, he alleged, had extorted a false confession from the unfortunate notary. This proceeding brought the General Assembly of the Church and the Court of Session into violent collision. The Assembly cited Graham to appear before it, and answer for his scandal against the church. The Court of Session stood up for the independence of their own jurisdiction and members; and sent their president Lord Provand, with the Lords Culross and Barnbarroch, as a deputation to the ecclesiastical court, disclaiming the Assembly's right to interfere in the matter. Both jurisdictions were obstinate, and the dispute was quashed without being properly adjusted. The result was, that the tenants of the temple lands pursued the young heir of the original proprietor, whose tutor and uncle, Sir James Sandilands, took up the matter with all the vindictive violence of the times. The Duke of Lennox lent his powerful aid; and, says Calderwood, " upon Tuesday, 13th February 1593, Mr John Graham of Hallyards went out of Edinburgh towards Leith, being charged to departe off the toun. The Duke and Sir James Sandilands following as it were, with clubs in their hands, and coming down Leith Wynd, one of Mr John's company looked back, and seeing them, they turned to make resistance. The Duke sent and willed them to go forward, promising no man should invade them; yet Mr John Graham's company shot, whereupon the Duke suffered Sir James and his company to do for themselves. Mr John was shot; his company fled before ever he was carried to a house. Sir Alexander Stuart's page, a French boy, seeing his master (Sir Alexander) slain, followed Mr John Graham into

* See a beautiful and accurate print of this MS. edited for, and presented to the Bannatyne Club, by James Dennistoun, Esq. Younger of Dennistoun.—P. 84.

the house, *dowped a whinger into him*, and so dispatched him. Before this encounter, Mr John was accompanied with three or four score." * The tragic end of this unhappy Lord of Session affords a curious picture of the times, and shows that our philosopher acted wisely in his endeavours to prevent *cummer* in such matters, and in his anxiety to "*mell with na sik extraordinar doingis.*" Probably his letter is of a date long previous to the death of Graham, and it may be before the latter was elevated from his justiceship to the Bench. Perhaps the deed quoted below has reference to the period when John Napier encountered such perilous disputes in the management of his father's estate. †

* Calderwood *MS. Advocates' Library.* See also Historie of K. James Sext, Melville's Diary and Spotswood's History, as to Mr John Graham. Melville the minister says in his Diary, that he was called *My Lord Little-Justice.*

† "Justice, Justice-Clerk, and your deputis, we grete you wele. Forsameikle as it is understand to us and our counsale, that, be vertew of lettres past under the signet and subscriptoun of our dearest guidschir King James the Fift of worthie memory, all and sindrie the tennentis and inhabitantis of the landis liand within the boundis of our Schirefdome of Perth, Stewartrie of Menteith, and baillierie of Dischoir and Toyer, pertenning then to Alexander Naper of Merchestoun, and now to our lovit Sir Archibald Naper of Edinbillie, Knycht, and Johne Naper, fear of Merchestoun, his sone and apperand air, ar specialie exemit frome all calling, jornaying, unlawing, or proceiding againis thame, or ony of thame, in ony wyiss, in our court or courtis of justiciarie or justice airis of our said Schirefdome of Perth, &c. or utheris courtis wheresumevir, except in our Schirefdome of Dumbartane and justice airis thereof allanerlie, conforme to the tennour of the infeftment past thereupoun of befoir to his umquhile guidschir, be our dearest grandschir King James the Ferd of worthie memorie; and, notwithstanding thereof, being surlie informit that in this our justice air of Perth, the said Archibald and his tennentis, dwellaris within the saidis boundis, ar arreistit to compeir and underly our lawis befoir you," &c. therefore the king issues his commands exempting Sir Archibald, &c. from answering in any courts but the justice air of Dumbartane. "Subscrivit with our hand at our bruch of Perth the xxi day of Julij, and of our Regnne the xv yeir, 1582."



The autographs will interest the reader. The royal signature is of James VI. while he was yet a youth. That of Montrose is of the grandfather of the lady who became the wife of John Napier's eldest son and was the sister of the great marquis. He was high chancellor, and viceroy of Scotland after James succeeded to the throne of England.* As for the signature Morton, the right hand that traced it is recorded in blood. The Lord Maxwell, a celebrated border noble, obtained a grant of the Earldom of Morton (upon the fall of the regent) in the year 1581, of which, however, he was deprived a few years afterwards. A deadly feud arose betwixt the Maxwells and the Johnstones; and in the celebrated battle fought betwixt them, the Lord Maxwell or Morton, being borne to the ground, stretched out his right hand for quarter, but it was instantly severed from his body. In the meanwhile, a certain feudal lady of the Johnstone clan issued from a family fortress, (which she had valiantly defended,) attended by a single female, and with the keys of the tower hanging on her arm. On the field of battle "she saw lying beneath a thorn-tree, a tall, gray-haired, noble-looking man, arrayed in bright armour, but bare-headed, and bleeding to death from the loss of his right hand. He asked her for mercy and help with a faltering voice; but the idea of deadly feud, in that time and country, closed all access to compassion even in the female bosom. She saw before her only the enemy of her clan and the cause of her father's captivity and death; and raising the ponderous keys which she bore along with her, the *Lady of Lockerby* is commonly reported to have dashed out the brains of the vanquished Lord Maxwell." † Such, gentle reader, were the characters and habits of Lords of Session, noblemen, and ladies, in the times of our philosopher, and with many of whom, notwithstanding the quiet and studious retirement of his own habits, he must have come into occasional contact.

Nor was his personal career entirely free from the storms of public life. According to his own account, it was in his "tender years and barneage in Sanct-Androis at the Schooles," that he first turned his mind to the study of Scriptural prophecy in connection with political events. It seems to

* Robert Birrel notices his son (the father of young Napier's lady) in connection with the fate of Mr John Graham. "The 19th Januar 1595, the young Earle of Montrois fought ane combate with Sir James Sandilands at the *Salt Trone of Edinburgh*, thinking to have revengit the slauchter of hes cusine Mr Johne Grahame," &c.—*Diary*, p. 34.

† Sir Walter Scott.

have been long before the year 1588, that after many doubts and misgivings he began to feel confidence in his undertaking. But the state of Europe as affecting the most vital interests of his country, and not the maturity of his plans, brought his treatise to light in the shape and at the time when it appeared. He was ardently devoted to the Protestant cause; but the most gentle and excellent dispositions, no less than his hereditary loyalty, saved him from becoming a tumultuous leader among the barons. At the same time he was regarded with reverence and affection by the most distinguished champions of the church. Among these his friend Robert Pont stood first. *

The philosopher must have been greatly shocked when his friend and pastor became a martyr in the cause to which both were devoted. It was in the Parliament of 1584 that James VI. made his first determined attack upon the privileges of the church. By the new enactments, its discipline and constitution were more than threatened; and the penalty attached to the slightest infringement of these arbitrary measures was death. On the very spot where they were proclaimed, Pont publicly protested against them; but not supported, as Knox was, by a physical force in opposition to the court, he was obliged to fly his country for a time with other clergymen who had embraced his spirited remonstrance. Nichol Dalgleish, his colleague, upon whom devolved the sole charge of St Cuthberts, was soon cast into prison, and even condemned to death (though the sentence was remitted) for holding some correspondence with his distressed brethren. † Such was the state of the philo-

* St Cuthberts was a most exemplary and conspicuous parish, under the auspices of Robert Pont and John Napier, during all the contentions with King James. In its old records, I find the following characteristic entry, of a date two years before the publication of the Logarithms: "Upon Thursday the 25th of June 1612, Convenit Mr William Arthur, Mr Richard Dicksone, Ministers, &c. The quilk day anent the supplication gevin in be William Naper, Laird of Wrytishouse, craving in effect that he myt have libertie to affix ane dask *at the west end of the Laird of Merchistoun's dask*; the session, because they knaw that he is ane honorabile gentelman quho bruikit office in the town of Edinburgh sundrie times, and lykwise ane of the mayst ancient heritors in the parochin, and that he hes borne burdene in the king's and kirk's stents, be ther presents grants and condescends that he big ane dask there, providing always that the session, upon the aicht of ony uther reponable or important cause, sall have liberty to transport and use the former sait quhen and quhair they plies, so that be thir presents the said William Naper clame no propertie nor heritage to the said sait and dask in the kirk, for the session nether may nor can give sick richt."

† Nichol Dalgleish was regent in the college of St Leonards, and one of the assessors from the nation of Albany, the same year that Napier was incorporated in St Salvator's.

sopher's own parish, and the treatment his most cherished companions met with in the year 1584, when he was occupied with his studies in theology and mathematics.

No sooner had this hurricane past, and the exiled clergymen been restored, when another yet more dangerous visited the country from abroad, powerfully influenced the intellectual schemes of Napier, and bestowed upon his retiring life a few stormy years of political existence. In the memorable year 1588, he was chosen by the Presbytery of Edinburgh one of their commissioners to the General Assembly of the church, * called together under most agitating circumstances, both for church and state. Napier, as we shall have occasion more particularly to notice, was an astrologer in days when astrology was a science of high repute among the learned; and if ever there was a year which seemed to fulfil the predictions of those who consulted the stars, it was 1588. "This," says Archbishop Spotswood, "was the *marvellous year* talked of so long by the astrologues, which this defeat, and the accidents which fell forth in France about the end of the same year, did in a part make good." The defeat alluded to was that of the gigantic effort of Spain, which failed through the almost miraculous destruction of her fleet; and many eyes must have been turned to the oracle of the occult sciences in Scotland, † at a crisis when the predictions of astrologers seemed in the very act of fulfilment. ‡ The venerable Assembly displays, even in our own times, something of the picturesque; and there is perhaps no sight or sound more imposing, than when under the steeple of old St Giles some huge pillar of the church, with a mind as powerful as his body, and a voice of no ordinary tones and compass, is roused in the noble theme; "ne quid ecclesia detrimenti caperet." But think what it must have been in "the marvellous year," and in the days of the "marvellous Merchiston." Of that very Assembly,—the first in which I can trace the name of our philosopher as a commissioner,—we derive a graphic ac-

* Original Records of the Presbytery of Edinburgh.

† That Napier was so, see Chapter VI.

‡ The other remarkable events of the period were, the death of Catherine de Medicis, "bludie Jezabell to the sancts of God," as James Melville the minister calls her in his Diary,—the murders of the Duke and Cardinal of Guise, at the instigation of Henry III., and the assassination of that monarch himself. The same journalist thus succinctly notes these events,—"The Duc and Cardinall wer slean in Decem. 88; the Quein, for hartsearnes, followit in Januar; and the King was stickit the August following."—*Diary*, p. 177.

count from the pen of its noted member, and sometime moderator, James Melville, " Terrible was the feir, persing were the pretchings, ernest, zealus, and fervent war the prayers, sounding war the siches and sobbes, and abounding war the teares at that fast and Generale Assemblie keipit at Edinbruche, when the newes war crediblie tauld, sum tymes of thair landing at Dumbar, sum tymes at St Andros, and in Tay, and now and then at Aberdein and Cromertie," &c.

The mind of Napier was particularly agitated upon this occasion. He had been long brooding over the depths of the Apocalypse, and began to perceive a divine light breaking upon his hitherto obscure lucubrations. The sequel I shall give in his own words. " Then," says he, " greatly rejoycing in the Lord, I began to write thereof in Latin; yet I purposed not to have set out the same suddenly, and far lesse to have written the same also in English, til that of late, this new insolencie of Papists, arising about the 1588 year of God, and dayly increasing within this iland, doth so pitie our hearts, seeing them put more trust in Jesuites and seminarie priests than in the true Scriptures of God, and in the Pope and King of Spaine than in the King of Kings, that *to prevent the same*, I was constrained of compassion, leaving the Latin, to haste out in English this present worke, almost unripe, that thereby the simple of this iland may be instructed, the godly confirmed, and the proud and foolish expectations of the wicked beaten downe; purposing hereafter, God willing, to publish shortly the other Latin edition hereof, to the publike utilitie of the whole church." * One great object was to awaken and alarm the conscience of King James, whose duplicity and inconsistent conduct harassed the church at home while beset by powerful enemies from abroad. Our philosopher proposed, therefore, to address his commentaries to that prince with such a solemn warning as the times suggested, and his majesty's conduct seemed to require. But in the beginning of the winter 1589, James was absent on his matrimonial expedition to Denmark. When he returned with his consort in the following year, he found every department of his government unusually tranquil, owing chiefly to the judicious management of the affairs of the church by Robert Bruce of Airth, aided in his exertions by such laymen as John Napier and Thomas Craig of Riccarton, who were at the same time members of the General Assembly. The whole country now became engrossed with the ceremony

* Preface to the Plain Discovery.

of the coronation, and great cordiality prevailed betwixt the church and the court. James was submissive to his clergy, and the clergy played the part of courtiers as well as they could.

But this calm was momentary. The loss of the Invincible Armada had not entirely discouraged the King of Spain in his attempts against Britain; and he met with secret countenance and aid from a few of the most distinguished persons in Scotland. In the very year after the destruction of the Spanish fleet, it appears that the prince of Parma, Philip's general commanding in the Low Countries, was in direct communication with a desperate faction in Scotland, of whom two of the most active and determined agents were Sir James Chisholm of Cromlix and his brother John Chisholm,—the father and uncle of the lady to whom Napier was now united. His first wife, Elizabeth Stirling, died about the end of the year 1579, leaving him one son Archibald, the first Lord Napier, and one daughter Jane. From among his own relations, but from a family deeply dyed in scarlet, he took a second spouse in Agnes Chisholm,* whom he married a few years after the death of his first. The ancient family of Cromlix, to which he was united by double ties, had shot forth a succession of Catholic bishops like stars from a Roman candle. The numerous progeny which he had by this lady were already considerably advanced, when a crisis arrived which must have been very appalling to the family at Merchiston. The Parliament of June 1592 had solemnly ratified the liberties of the church, and the freedom of its jurisdictions; but the Scotch clergy, like other successful sects, evinced a spirit of persecution which had not the effect of overawing their opponents, and even rendered some of them more desperate. It was insisted, that as the reformed religion had been constitutionally established, all who professed the Roman Catholic faith, should be compelled either to embrace the Protestant doctrines, or suffer the pains of rigorous excommunication; and that, after such delinquents had continued for the space of a whole year thus cast off from Christian society, their property should

* She was a great-granddaughter of James IV., her grandmother being the daughter of that monarch and his celebrated and ill-fated love, Margaret Drummond. Agnes Chisholm was the second cousin of the philosopher's first wife (Sir James Stirling of Keir having married a daughter of the prelatic concubinage betwixt the Bishop of Dumblane and the Lady Jean Graham, daughter of the Earl of Montrose.) She was also the second cousin of his father, whose grandmother was Janet Chisholm. For the genealogy of the Chisholms, consult the Strathallan MS.; and for the Bishops of Dumblane, see the table of bishops in the Rev. M'Gregor Stirling's edition of Nimmo's Stirlingshire.

be forfeited to the crown. This policy had been adopted against various individuals, and, in particular, George Kerr, a brother of the philosopher's classfellow, Lord Newbottle, having refused to conform upon the requisition of the presbytery of Haddington, was excommunicated. David Grahame of Fintry, and Barclay of Ladyland, suffered the same sentence. *

At this time Sir James Chisholm, who was the king's master of household, had fallen under no persecution, and was not even suspected. Yet since at least the close of the year 1589, he had become deeply involved in a treasonable plot to aid Spain against Britain; and various members of his family were amongst the most active plotters. His uncle William Chisholm, the Ex-Bishop of Dumblane, and now of Vason in France, where he had been driven for his adherence to the Catholic cause and the fortunes of Queen Mary, was of great account among the Jesuits, and seems to have been the person through whom Sir James was seduced. The bishop's other nephew John was the party employed to carry money from Spain to aid the cause in Scotland. This appears from the terms of a letter which fell into the hands of the Protestants after the plot was discovered. It is addressed by one Bruce, a Papist, to the Duke of Parma, written in French cypher, and dated from Edinburgh 24th January 1589. According to the translation made of it upon disclosure, it commences by informing the Duke that "Monsieur Chesholme" had arrived in Scotland after a voyage of five days: that he instantly proceeded to the Earl of Huntly, and delivered letters from the duke to that nobleman in his own house in Dumfermline on the 13th of October: the letter then acknowledges receipt by the hand of John Chisholm of "sax thousand twa hundreth thre scoir twelve crounis of the sum, and thre thousand sevin hundreth Spanish pistolets" from the Duke of Parma. The writer proceeds to detail the plans and resources of the Spanish party in Scotland, and adds, "likewise I sall help myself by the prudence of Schir James Chesholme, eldest brother to the said John quha brocht the money from your hienes, for he is a man confident, wise, ane on our pairt, and *very little suspect*." It appears, however, that some suspicion had arisen against the family at this time, for the same letter mentions, that one Thomas Tyrie had reported to King James that Bishop William had spoken with the Duke of Parma, very much to his majesty's disadvantage, and that John Chisholme was also in close communication with his uncle the bishop.

* Calderwood.

Thus the celebrated plot of "the Spanish blanks" was organized; and when nearly ripe, the person selected to fire the train, by carrying the treasonable papers abroad, was John Napier's father-in-law,—the grandfather of his numerous second family. Probably that prudence, which might have added success to the scheme had Sir James followed out the first plan, saved him from so perilous a part in the conspiracy. George Kerr, finding it impossible to live in comfort or safety in Scotland under his sentence of excommunication, was on the eve of quitting the country; and it was finally arranged that the commission should be transferred to him. While he was waiting for further instructions, near the Island of Cumray, Andrew Knox, the minister of Paisley, acquired secret intelligence of the plot, and with a spirit and determination worthy the name he bore, proceeded with some armed men, and several Protestant gentlemen, on board of the vessel where Kerr was, and instantly seized him. Various treasonable letters and papers were discovered in the coat sleeve of one of the mariners. Graham of Fintry and Barclay of Ladyland were apprehended about the same time. This important intelligence reached Edinburgh upon a Sunday during divine service. The sensation was so great that the clergymen brought their sermons to a speedy conclusion, and exhorted the people to arm themselves immediately in order to insure the safe custody of the prisoners. These unfortunate individuals, escorted by a sort of national guard hastily got up among the townsmen, were lodged in the tolbooth of Edinburgh. Meetings and solemn conventions of the ministers and well-affected barons followed, which at once alarmed and enraged the monarch, who "was haistit from his pastyme sonar nor he thoght to have bene."* His presence was the more necessary, that three earls, Huntly, Angus, and Errol, were deeply implicated,—their signatures having been found to certain suspicious blanks among the papers; and before the king's arrival in Edinburgh, the Earl of Angus had been carried a prisoner to the castle.

A most disgraceful scene, not generally noticed by our historians, now occurred before the privy-council. George Kerr would make no confessions; and it was proposed to put him in the *bootikins*, an infernal instrument of torture, worthy of the most savage age of heathen persecution.† The justice-

* His pastime was feasting at the marriage of Napier's cousin, the young Earl of Mar.

† Spotswood, in his History of the Church, says, "Mr George Ker at his examination did ingenuously confess." Dr M'Crie, in his Life of Andrew Melville, observes that "Graham of

clerk, Sir Lewis Bellenden, * alarmed at the menaces of Kerr's friends, refused to comply; but the monarch himself ordered the torture to proceed. The nature of it was to lacerate and crush the limb of the sufferer, by driving iron wedges between the shin bone and the iron boot, the interrogatories being repeated at each successive stroke of the hammer. Kerr's fortitude was proof against the dreadful preparatives, and the first blow; but upon the application of a second, he cried out for mercy, and said he would confess all. The substance of his deposition taken on the 13th February 1592-3 was,—that in June 1592, Sir James Chisholm had obtained from the Earls of Angus and Errol, in their own lodgings in Edinburgh, their respective signatures in French, as if addressed to the King of Spain, but with blanks above, to be filled up by one Mr William Crichton, a Jesuit, as he pleased,—that the other blanks produced, with their respective signatures, had been procured about the same time, and that Sir James Chisholme held secret conferences on the subject with David Graham of Fintrie and the witness Kerr,—that at first the noblemen implicated had agreed that Sir James, "quha wes then ane of his majestie's maister houshaldis, suld have gone to Spain with this commission, in respect he wes utherwise bounit towardis his uncle Maister William Chesholme, callit Bischop of Dumblane, for Schir James had the first credeit of this erand with the nobillmen," &c.; but not being ready in time, and "Maister George Ker being bounit off the cuntrie, it wes thocht best that the same commission suld be gevin to him," and "he wes employed in that errand the rather because baith his gud-dames were Creichtouns." † The result contemplated was, that 30,000 men should land out of Spain on the west coast of

Fintry and Ker being both examined before the privy-council, testified," &c. But David Moysie, in his contemporary memoirs, says, "It wes thocht meit, because of Mr George Keris denyell, that he suld be butted; and the justice-clerk and Mr William Hairte, being bosted be his freindis, durst not doe the sam untill the tyme his majestie, taking the maiter hiechly, wold have the same donne. And efter the secund streak he cryed for mercie, and confest all."—P. 100.

* The philosopher's relative; being eldest son and successor in office to Sir John Bellenden.

† The confessions of the traitors, with the intercepted blanks and letters, &c. were all published at the express desire of the king, and with an admonitory preface, like a sermon on the occasion, drawn up by a clergyman. The treatise issued from the press of the king's printer, Robert Walde-grave, 1593, a few months before Napier's Treatise on the Revelation was published from the same press. Mr Pitcairn has reprinted the confessions in his Criminal Trials, and considers the tract almost unique. There is one copy in that gentleman's possession, and another in the Advocates' Library.

Scotland, march to Carlisle and invade England, leaving 5000 Spaniards with the noblemen in Scotland to proclaim liberty of conscience. David Graham deponed to the same effect. On the 15th of February, the Earl of Angus made his escape from the castle; and upon the 16th, Fintrie, more dead than alive, and certainly the least guilty of all concerned, was beheaded at the Cross. But Kerr's life was spared, and he was sent to the castle of Edinburgh, from which he too made his escape on the 20th of June following.

The most vigilant synod in the kingdom, that of Fife, was summoned at St Andrews on the 25th September 1593. Great excitement prevailed at this assembly, where it was determined that commissioners should be appointed from the separate estates of barons, boroughs, and clergy, "to declare freely to his majesty the mind and resolution of all his godly and faithful subjects within the province, that they are ready to give their lives rather than suffer the same to be polluted with idolatry, and overrun with bloody Papists." The assembly then solemnly declared, "that the principal and chief enemies, the Earls of Huntly, Angus, and Errol, Laird of Auchindoun, and Sir James Chisholm, have, by their idolatry, heresy, blasphemy, apostacy, perjury, and professed enmity against the kirk and true religion of Jesus Christ within this realm, *ipso facto* cut off themselves from Christ and his kirk, and so become most worthy to be declared excommunicated, and cut off from the fellowship of Christ and his kirk, and to be given over to the hands of Satan, whose slaves they are, that they may learn, if it so please God, not to blaspheme Christ or his Gospel," &c. It is further added, that "the said Sir James Chisholm being one of the principal complices and devisers of their most malicious plots, the said synod found that they had good interest and occasion to excommunicate and cut him off," &c.*

Thereafter, on the 11th of October, an extraordinary meeting of delegates was held at Glasgow, which professed to be convened "according to the bande maid be our sourane lord and his estatis for maintenment of the trew religion." At this meeting, the noblemen, barons, gentlemen, and ministers of the various shires, made, constituted, and ordained, "the Lard of Calderwood, [James Maxwell,] the Lard of Merchiston, [John Napier,] the Gud-man of Duchall, the Lard of Greinoh, Mr Robert Lindsaye, Mr Johne Hewesoun, Mr Johne Haye, Mr Johne Couper, and Mr Patrik Scharp, ministers, or ony thre of the saidis ministers, thair lawfull and undoutit commissioners, to convein and meet

* Calderwood.

at Edinburgh," with commissioners from the other provinces, " to give thair advyss and consale," &c.* These commissioners met accordingly at Edinburgh on the 17th of October. As Sir James Chisholm was not subject to the jurisdiction of the province in which he had received sentence of excommunication, the first act of these commissioners was to ratify all that had passed, and then to ordain a proclamation to that effect from the pulpit of all the parish churches on the following Sunday, which was the 21st. Our philosopher must have been particularly conspicuous at this convention, which confirmed the excommunication of his own father-in-law; and his family, if they attended their parish church on the day appointed, heard their grandfather doomed to exclusion from the social comforts of life, and the blessings of the church.

The king used his utmost endeavours, both with his Protestant barons and the clergy, to prevent this vigorous measure, and was inveterate against the proclamations. " He said the ministers were cruel, and as they sought blood they should have it." † He complained to the Lord Hamilton at Hamilton House, that he knew not how to act, or which way to turn. " In whom can I trust more than Huntly," said he, " and yet, if I countenance him, the clergy call me apostate."—" There is no difficulty," replied the nobleman he addressed; " countenance them if they be not enemies to religion; but if they be, receive them not." James having muttered something about liberty of conscience, the Lord Hamilton brought him to his senses by thundering in his ear, " Sir! then we are all gone, then we are all gone; if there be no more to withstand them than I,—I will do it."

The same convention of the 17th October, which ordained the proclamations, appointed a select committee to follow the king wherever he was bound, and to lay before him, in a personal interview, certain well-digested instructions for the punishment of the rebels, the safety of the church, and the quieting of the public mind. The men to whom this extraordinary and perilous mission was entrusted, must have been selected from the most able and courageous of the convention. They were for the barons, John Napier of Merchiston, and James Maxwell of Calderwood.‡ The clergy, however, shrunk

* Records of the Presbytery of Glasgow.

† Melville's Diary.

‡ 17th October 1593.—" Petitiones per Commissarios Ecclesiæ Scoticanæ Regi exhibitæ." (Then follows the petition.)—" Theise forseid petitionis and conclusions being read and considered by the commissioners of the kirk, barons, and burghs present, the said commissioners agreed

from this mission, and declined it to a man, with the exception of their sturdy moderator, James Melville, who then stepped forward to assert the courage of the school of Knox. To him was joined Patrick Galloway, the king's ordinary minister, who was going to join his majesty at any rate. With the addition of two burgesses, this brave little band, just six in all, girded their loins, and set out that very day to seek an interview with the king. *

A few days before the convention that appointed them had met, namely, on the 12th of October, King James,—harassed by his clergy and haunted by witches; now dreading the King of Spain, and now in terror for the wild Earl of Bothwell, to whose harlequin treasons he was most unwillingly compelled to play pantaloon, † — was trotting at the head of his retinue to the borders, with the temper of a goaded ox. Suddenly a most unwelcome apparition arrested his progress at Fala. The Earls of Angus, Huntly, and Errol, and Sir James Chisholme, had been hiding themselves among the mountains. Aware of the royal progress, they determined to extort some favourable expressions from the king himself, and started up in his path on the high road at the foot of Soutra-Hill. Falling on their knees before him, they earnestly implored a fair trial, and that they should not be condemned unheard. The king, though favourable to the Popish earls, was very much alarmed for the interpretation that might be put on this audience, and refused to treat with them; but, instead of ordering them into custody, he dismissed them without committing himself, and immediately sent a report of the whole matter, by the Master of Glammis and the Abbot of Lindores, to Queen Elizabeth's ambas-

to the same, and promised to stand by them; and for this purpose, hath directed in commission these brethren,—the Laird of Merkinston younger, the Laird of Calderwood, the commissioners of Edenburghe and Dundee, Mr Patrick Galloway, and Mr James Melville, to present these humble petitionis to the king's majestie, and to retourne his majestie's answer back with all diligence. Ordains the excommunication of the Erles of Huntley, Angusse, and Erroll, the Lairde of Auchindowne, and Sir James Chesholme, to be intimate in all the kirkes of Lowthian the next Sabbothe."—*Bibl. Cotton. Caligula*, d. 2, fol. 190. *Fœdera*, xvi. p. 222.

* "It behoved me (all uther refusing except Mr Patrik Galloway, the kingis ordinar minister, wha was to go thither) to tak jorney to Jedwart, accompanied with twa barrones, the Lards of Merchiston and Caderwoode, and twa burgesses of Edinbruche; whar finding the king were bot bauchlie lukit upon."—*Melville's Diary*, p. 208.

† The Earl of Bothwell's dramatic invasion of the king's privacy, when that nobleman, armed cap-a-pee, fell on his knees and asked pardon, occurred 24th July 1593. "After thai came in, hes majestie wes coming frae the backstair, and his breiks in his hand."—*Birrel's Diary*.

sador and the clergy in Edinburgh. "It was," says Melville in his Diary, "verie greivus to the breathring to heir that the saids excummunicat lords haid repearit to his maiestie and spokin him at Faley, even immediatlie befor the meiting of the kirk. This was given in commission to be regratit."

The selection of our philosopher, a sage who had hitherto kept himself aloof from public affairs, and whose wife was the daughter of one of the delinquents, presents a good illustration of his character. It speaks volumes as to his entire devotion to the cause of the church, and points him out as a man whose courage, talent, and integrity were universally admitted. The delegates found the king at Jedburgh, not in the best humour with his clergy, and his nerves in a state to receive an additional shock of no ordinary kind, when the marvellous Merchiston and the moderator of the church were ushered into his presence. It must have been a scene worthy of historical painting, this interview betwixt the grotesque king of Scotland and the recluse philosopher. We may imagine the monarch as pourtrayed in that ancient description of him which seems to have been drawn by an actual observer. "Of a middle stature, more corpulent throghe his clothes than in his body, yet fatt enouch, his clothes ever being made large and easie, the doubletts quilted for steletto proofe, his breeches in grate pleits, and full stuffed; of a timorous dispositione, which was the gratest reasone of his quilted doubletts,—his eyes large, ever roulling after aney stranger cam in his presence; in so much as maney, for shame, have left the roome as being out of countenance; his beard werey thin; his toung too large for his mouth:" &c.* confronted with John Napier, with his serene presence, thoughtful eye and ample beard, rarely seen within the royal circle.

It has not been observed by any of our historians, nor in any biographical notice of our philosopher, that he acted so prominent a part at a time of more than usual excitement against the Catholics; and with better reason than when John Knox rated Queen Mary. To those well-known scenes which have been so often pourtrayed, Napier's mission to her son forms a curious *pendant* in the history of the church. After the parliamentary establishment of the Protestant doctrines in 1560, their popular apostle lost his power, and sank into comparative insignificance with his party in the state. The clergy of his

* Printed by J. G. Dalyell, Esq. in his Fragments of Scottish History.

own school who succeeded him, though eager to catch his mantle, were made to feel, in reference to their powers of dictation and the independence of their church, a change of circumstances in the state of Scotland. Upon the occasion of the Spanish blanks, the grounds of remonstrance were the most crying that could have threatened the country; and the baronial interests were represented by one whose talents were far in advance of his age. But it was no longer with deserted queens that the clergy had to contend, nor were the lords of the congregation now at their call. The alleged vices of a female court, upon which vulgar slander delights to dwell, and whose follies can easily be magnified into crimes,—" the monstrous regiment of women,"—no longer afforded a theme, *ad captandum vulgus*. A mean-spirited, but shrewd and wily monarch reigned, whose precocious youth had learnt a deplorable lesson of selfish caution. His timorous heart must have quaked at the sight of the unflinching moderator of the church, and the majestic Merchiston; but he kept his trepidation to himself, and his rolling eyes shed no tears.

James commenced with a violent invective against the synod of Fife, which had presumed to excommunicate beyond the bounds of its jurisdiction in the case of Sir James Chisholm; and spoke bitterly against the moderator's uncle Andrew Melville, and Mr David Black. The representative of the church replied to this tirade, " as it pleasit God to giff, and efter the king's coler appeasit, we dischargit our commission in maist humble and fectfull manner." The instructions of this commission were bold and peremptory. In the *first* place, his majesty was requested not to be hasty in fixing the day of trial claimed by the rebels at Fala; but that all true professors of the Gospel, the proper pursuers in the case, should be apprized of the diet, that they might have time to consult with each other on the subject. The apprehension and close confinement of the apostates formed the *second* head of the petition. In the *third* place, it was craved that the accusers, and not the accused, should have the selection of the assize. In the *fourth* place, that the excommunicated rebels, so long as they laboured under that disability, should not be recognized as having any *persona standi in judicio*, or the benefit of law. And in the *last* place, it was proposed, that if, contrary to the wish of the church, the trial was to take place forthwith at Perth, for which it was understood that the rebels were making great preparations, the professors of religion alone were to form a body-guard to surround the king's person; " and in this," added the instruc-

tions, " we of the church are determined, though we perish in the attempt; for the country shall not hold those apostates and us together."

The king could scarcely endure the reading of the preamble; and, turning fiercely to Merchiston and Calderwood, declared that he would neither acknowledge the convention of Edinburgh, constituted without his authority, nor them for commissioners. The two barons, of whom our philosopher must have been the spokesman, " stud," says Melville, " honestlie be it; saying it was in trew and upright hartes, with all dewtie and reverence to his maieste for preventing of imminent evill and danger to his state, religion, and countrey." * As for the convention, which was held in Merchiston's parish church, and had doubtless been much indebted to his zeal and activity, it was defended upon the ground that his majesty's own proclamations authorized such assemblies; and they reminded the king at the same time of the exigency of the case, and of his own expressions when he superintended the torture of George Kerr, " that the crime was above the reach of his power to pardon." James, after a lengthened discussion, consented to receive them as subjects, but not as delegates from the convention. He excused his reception of the three earls and Sir James Chisholm at Fala, as an event which took him by surprise, and in which he said no more than the meanest of his subjects in that humble attitude on the highway would have been entitled to extort; and when the barons repeated the offer to guard his person on the day of trial, he replied, that he would make choice of his own guard. †

Napier and his colleagues seem to have executed their commission as fearlessly as the church expected at their hands. They did not retire until their petition was received. On the following morning they obtained an answer in writing, in terms of the above conference; to which was added, that the king would hold a convention at Linlithgow, and take order with regard

* *Diary*, p. 208.

† " Answerit, as God shall judge his soule, he knewe not of their cominge, nor was under no privy paction or condition with them, and when upon their knees they had craved tryall, he could not deny the same to them if it had been the simplest of the lande. Hee dismissed them without any promise."

" Answerit, such as he charged should be welcome, and such as came undesired should not be welcome; and he should take order, that they should not come with such number as might trouble the day of law."—*Ad Petitiones prælibatas Responsio Regis. Bibl. Cotton. Fœdera*, xvi.

to all these matters as soon as he returned from the south. On the third day, they travelled homewards to report their proceedings to their brethren, who were anxiously awaiting the result. *

But the king's double dealing had very nearly brought matters to the immediate decision of civil war; and we may for the first and last time contemplate our philosopher as eyeing the hilt of his sword, and even (with him a very necessary precaution) practising the art of extracting it from the scabbard. No doubt he incurred at this period some risk of not being spared to publish the Logarithms. The excommunicated earls had taken the field in great force to attend the king at Perth. The convention instructed their commissioners to repair to their respective districts, to spread the news of the king's answers, and to sound the tocsin. "The quhilk," says the moderator in his Diary, "was done be evrie commissioner with exact diligence." He also adds, that the best and most zealous barons, (which must have included our philosopher, their leading commissioner) gentlemen and burgesses, were on foot to meet the forces of the Earls of Huntly and Errol who had occupied Perth. The collision was prevented, however, by the king's charge to those noblemen to dismiss their followers, and remain with a few friends in Perth to abide his judgment. Upon this the Protestant party also laid down their arms, and hastened from all quarters to attend the convention at Edinburgh. Here it was resolved, that the delegates sent to Jedburgh should again meet his majesty at Linlithgow, and repeat their former instructions. This was done according-

* Spotswood, in his History of the Church (p. 398,) is mistaken, when he says the commissioners "humbly besought his majesty to vouchsafe the assembly some answer in writing; but he absolutely refused, and so they took their leave." Before they left the presence, they had brought James from a state of wrath to comparative condescension. "In the end, his majestie, willing that we should report his good intention and honest meaning in this turne, with solempne oathes, protesting before God and his conscience, affirming that he should proceed in this matter as he would answer to God and the estates of this kingdom, and that he meant nothing in that matter but sincerity of religion, and security of good men, and that such substantiall order should be taken with theise excommunicat earles that religion might be in security, and none should be suffered afterward to trouble religion and professe papistry, and that his good intention and our petitions should go together."—*Bibl. Cotton. Fœdera*, xvi.

Melville expressly says they got their answers in writing next morning. Upon the 20th October, the convention received the commissioners, "their brethern, and good frendes the Larde of Marchiston younger," &c. who delivered the king's answers.—*Fœdera ut supra.*

ly, their numbers being doubled, and the moderator of the church accompanying them as before to present the petition. " Bot," says Melville, " the Chancellor Mattellan haid dressit all to our coming, sa that their was nocht mickle ado at that dyet, bot all remitted to a new convention of esteats, to be halden at Edinbruche the moneth following. The erles Papists turning bak, and all our folks going ham, with thankfull harts to God for disappointing of a maist dangerus interpryse as ever was of any be Papists in this land."

The remonstrance which our philosopher conducted, was made in that judicious spirit which seems to have had more effect in bending the stubborn will of James, than if Knox, arrayed in all the terrors of his blood-provoking tongue, had stood in *propria persona* before him. The characteristics of the latter school of clerical censure was an overweening idea of self-importance, and a lamentable want of tact and temper, calculated, indeed, to madden a mob or throw a female into hysterics, but not to render glory to God. Napier knew better how to reconcile with itself the sacred injunction, " fear God, honour the king ;" nor could a nobler example be afforded than a letter he now wrote to his majesty ; and which shall be immediately quoted as forming the sequel of this adventure. It contains remonstrance without sedition, rebuke without disloyalty, and admonition without impertinence ; distinctions which the genius of Knox could not appreciate.

With increased dislike to his clergy, and a corresponding growth of favour towards the Popish conspirators, James brought them to a collusive trial, which had no other result than the well-known " act of abolition." This was in fact an acquittal under securities which, in those lawless times, were of very little value. They were absolved from all the consequences of the " Spanish blanks," upon condition that they were not to repeat such mal-practices ; that those of them who embraced the Protestant faith and discipline might remain in the country within certain appointed bounds ; that they should purge their households of Jesuits, and if they preferred a voluntary exile, were to become bound not to plot or practice against their country ; that the Popish earls should find security each in forty thousand pounds, and Sir James Chisholm, * and Gordon of Auchindoun each in ten thousand.

* The *battle of Glenlivet* brought this matter to a crisis. Upon the 8th of June 1594, four months after the date of Napier's letter to the king, the Earls of Angus, Huntly, Errol, and Auchindoun, (who was Huntly's uncle,) were forfeited in Parliament. Upon the 3d of October fol-

It was in the month of October 1593 that Merchiston's interviews with James at Jedburgh and Linlithgow took place. A third deputation laid the same petition before him in December following; because, in the intermediate month of November, the act of abolition had been proclaimed, to the great dismay and dissatisfaction of the Protestant party. At this very time the king and his consort were occasionally residing in the houses of our philosopher's relations, where doubtless his character and conduct would be fully canvassed.* Upon the 10th of January his majesty attended the convention of estates at Edinburgh, when some measures were adopted against the conspirators who had scorned the act of abolition and its conditions. Queen Elizabeth was most anxious that the Popish lords should be brought to justice, and her ambassador was closely watching these proceedings. On the 22d of the same month, the act of abolition was declared null and void. Upon the 29th, John Napier wrote the following epistle to King James, which is prefixed as the dedication to that monarch of "the Plain Discovery" published at this crisis with a pointed reference to the transactions of which a sketch has been given.

lowing, Huntly and Errol defeated Argyle and his Highlanders, but Gordon of Auchindoun was slain, and the Popish earls could make no head against the king himself, who immediately took the field against them. I can find no farther trace of Napier's father-in-law after the act of abolition in which he is mentioned. He is not included in the act of forfeiture and sentence of treason passed against the rest, nor does he appear to have been at the battle of Glenlivet. Probably the Philosopher had persuaded him to accept the conditions of the act of abolition. "His remains lie in a niche in the west wall, inside of the nave of the church of Dunblane. His tombstone executed in low relief, and exhibiting in a mutilated state the family arms, has an inscription in relief, of which the following words are legible: *Hic jacit honorabilis vir Jacobus Chisholme eques auratus de Dundorn.*" "The Chisholmes of Cromlix merged by marriage in the Maderty and Strathallan branch of the Drummonds; and the Cromlix estate, on which is the celebrated Spa of Dunblane, was latterly, by the same process, transferred to the family of Kinnoul."—*M'Gregor Stirling's Stirlingshire*, 414.

* "Upone the 27 December 1593, the king and queenis majesteis baithe tuik jorney unto Sterling, and were the first nicht in Linlithgow be the way; and at thair comming to Sterling, ludgit in the Erle of Ergyle's house theare, and fra that in the Lady Maris ludging, quhill the castell wes prepaired. Upone the 7 Januar 1593, the king past from Sterling to Tullibardin, quhair he remanit a nicht."—*Moysie's Memoirs*, p. 111.

"To the Right Excellent, High and Mightie Prince, James the Sixt, King of Scottes, Grace and Peace, &c.

"Forsomuch (right highe and mightie Prince) as both this our divine prophet St John, intreating here most speciallie of the destruction of the Anti-christian seate, citie, and kingdome, doth direct the execution of that great worke of God's justice and just judgement to the kings of the earth: as also, the whole prophets of al ages have for the most part directed al their admonitions generally to kings, princes, and governors, to the effect that they (as Heads-men) being by holy admonitions forewarned, might (according thereto) holde all the whole body of their commoun wealth in good order; for certaine it is that the heade, being well affected, will of necessitie ministrat health and wholsome humors to the whole body. Therefore it is likewise the dutie of God's servants in this age, interpreters of prophecies, as well (according to the example of the prophets) to incourage and inanimate princes, to be ready against that greate day of the Lord's revenge, as also to exhort them generally to remove all such impediments in their cuntries and common wealths as may hinder that work and procure God's plagues. For the which causes wee, also all your M. subjects that any waies (how litle soever) have addicted our studies unto these propheticall mysteries, do not onely crave your highnes to abide constant and couragious against that day of the destruction of that Apostatik seate and citie, in case (God willing) it fall in your time; but also in the meane time, untill the reformation of that idolatrous seate, to be preparing and purging your M. own seat and kingdom from all the enemies of that cause: yea, and from all others any waies enemies or abusers of justice: for verely and in trueth, such is the injury of this our present time, against both the Church of God and your M. true lieges, that religion is despised, and justice utterly neglected: for what by Atheists, Papists, and cold professors, the religion of God is mocked in al estates: Againe, for partialitie, prolixitie, dearth, and deceitfulnes of lawes, the poore perishe, the proud triumphe, and justice is no where to be found. Praying your M. to attend your self unto these enormities, and (without casting over the credite thereof to wrong wresters of justice) your M. self to wit certainly that justice be done to these your true and godly lieges, against the enemies of God's church, and their most cruell oppressors: Assuring your M. be concordance of al Scriptures, that if your M. ministrate justice to them, God the supreme judge shal ministrate justice to you against al your enemies, and contrarily if otherwise.

Therefore Sir, let it be your M. continuall study (as called and charged thereunto by God) to reforme the universall enormities of your country, and first (taking example of the princely prophet David) to begin at your M. owne house, familie and court, and purge the same of all suspicion of Papists and Atheists or Newtrals, whereof this Revelation foretelleth that the number shall greatly increase in these latter daies. For shall any Prince be able to be one of the destroyers of that great seate, and a purger of the world from Antichristianisme, who purgeth not his owne countrie? shal he purge his whole country, who purgeth not his owne house? or shal hee purge his house, who is not purged himselfe by private meditations with his God? I say therefore, as God hath mercifully begunne the first degree of that great worke in your inward minde by purging the same from all apparant spot of Antichristianisme, as that fruitfull meditation upon the 7. 8. 9. and 10. verses of the 20. Chapter of the Revelation, which your highnes hath both godly and learnedly set forth, doth beare plaine testimony, to your M. high praise and honour; so also wee beseeche your M. (having consideration of the treasonable practices in these present daies, attempted both against God's trueth, your authoritie, and the common wealth of this countrie,) to proceede to the other degrees of that reformation, even orderly from your M. owne persone til your highnes familie, and from your family to your court; til at last, your M. whole country stand reformed in the feare of God, ready waiting for that great day, in the which it shall please God to call your M. or yours after you, among other reformed princes, to that great and universall reformation, and destruction of that Antichristian seat and citie Rome, according to the wordes prophecied, Apoc. 17. saying,—the ten horns are ten Kings, &c. these are they that shall hate that harlot, and shall make her desolate and naked, and shall eate up her flesh and burne herselfe with fire;—beside also a warrant and commaund generally given to all men, Apoc. 18, saying,—reward her even as shee hath rewarded you, and give her double according to her workes, and in the cup that she hath filled to you, fill her the double. And now, because the spirit of God, both by all his prophets generally and by St John particularly, commends and directs the execution of justice to kings and rulers, I trust no man shall thinke that this our discovery (wherein is contained God's justice and severe judgement against the Antichristian seate) can more justly be dedicate unto any man than unto these ten Christian kings, sometimes maintainers of that seate, whome or whose successors now both the

prophet promises to be executers of that judgment, as also in whose kingdomes reformation is already begunne; but, because of these kingdomes, sometimes maintainers of that seate and nowe desisting therefro, this your M. realme is undoubtedly one, as also this present treatise, both being written by your highnes subject and in your M. native language,—were unproper to be directed to any of the other princes. Therefore, of necessitie I am led (as by the eare) to direct and dedicate these primices and first fruites of my study unto your highnes, wherein, if perchance I should seme any waies more presumpteous then acceptable, I doubt not but your M. clemencie will pardone that presumption that comes of necessitie: but contrarily, if I herein shall be found acceptable, (as verely I look for of your M. humanitie) then certainly, not onely conjoyne I unto the former necessitie, a voluntary heart, and so do offer these presents both gladly and necessarily unto your highnes, but also it shall incourage both me and others your M. lieges, to proceede, every man in his own calling, to all kinde of godly workes and good exercises, to the honour of God, edification of his church, your highness renowne, and welfare to your M. realme, when they shall finde your clemencie to become the patrone and protector of all zealous students, and an allower and accepter of their godly exercises. For let not your M. doubt but that there are within your realme (als wel as in other countries) godly and good ingynes, versed and exercised in al maner of honest science and godly discipline, who by your M. instigation *might yeelde foorth workes and fruites woorthie of memory*, which otherwise (lacking some mightie Mæcenas to incourage them) *may perchance be buried with eternall silence*. Hoping, therefore, that your highnes will be a protector of us and our godly exercises, wee pray and humblie beseech the Almightie to be also unto your highnes selfe, and most honourable bedfellowe the queenes M., a perpetuall protector of your honourable estates and welfare of your persones, both in body and soule, to the quieting of your M. lieges, increase of the true church, and honour of God, to whome, in Trinitie and Unitie, bee praise for ever. At Marchistoun the 29. daye of Januar. 1593.

Your highnes most humble and obedient subject,

JOHN NAPEIR, *Fear of Marchistoun.* *

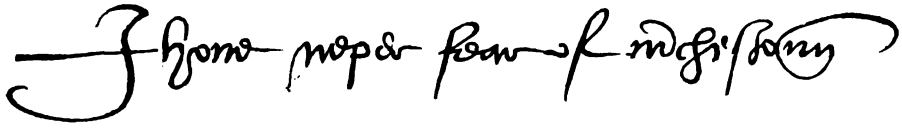
* A very absurd mistake as to this signature occurs in some notices of Napier, published in 1830 by the Society for the Diffusion of Useful Knowledge. "The first name we shall mention is that of JOHN NAPIER—often, but erroneously, called Lord Napier. He was not a nobleman, but only what would in England be called a lord of a manor. Such persons, in Scotland,

As a frontispiece to this noble letter, the philosopher selected the arms matrimonial of Scotland and Denmark in compliment to the king's recent alliance. Underneath the heraldic conjunction, however, he added the warning sentence with which this chapter concludes.

IN VAINE ARE AL EARTHLIE CONIVNCTIONS, VNLES VVE BE HEIRES TOGETHER, AND OF ONE BODIE, AND FELLOVV PARTAKERS OF THE PROMISES OF GOD IN CHRIST, BY THE EVANGELL.

were formerly designated *barones minores*, or *lesser barons;* and to this class the baron of Bradwardine belonged as well as Napier, who in like manner was baron, or, as he himself expresses it, 'Peer of Marchistown,'—an old seat of the family in the neighbourhood of Edinburgh."—*Pursuit of Knowledge under Difficulties.*

Napier was as likely to have signed pope as peer; which term was not then in use to express the rank of a nobleman. Having been, *more majorum*, invested with the fee of his paternal barony during his father's life, who retained the liferent, our philosopher wrote his name accordingly. From a contract of lease, dated at Gartnes, 23d April 1584, a fac-simile of his signature is here given, being the most distinct I could find, for the benefit of the Society for the Diffusion of Useful Knowledge.



CHAPTER V.

AN able writer in a biographical work to which we have already referred more than once, has sketched the rise and early progress of Protestant learning in this country, under the title of "the Life of Andrew Melville, containing illustrations of the ecclesiastical and literary history of Scotland during the latter part of the sixteenth, and beginning of the seventeenth century." * This task he has accomplished, with an accuracy of research and depth of criticism that have deservedly met with great applause. It is only in the strict fulfilment of our own biographical duty that we are so bold as to point out an instance where his researches have failed him; and one which leaves his sketch of the ecclesiastical literature of Scotland essentially imperfect. While minutely recording literary facts of far inferior interest, he has not observed that Napier, whom he places at the head of our mathematicians, and pronounces to be the man "who reflected the highest honour on his country;" † occupied at the same time the throne of recondite theology in Scotland. ‡ Speaking of the very epoch of the publication of Napier's commentaries he says, "Theological learning made great advancement during this period. Formerly no commentary on Scripture, and no collection of sermons had appeared in

* Dr M'Crie.

† Vol. ii. p. 321.

‡ By "a plaine discovery of the whole Revelation of Saint John: set downe in two treatises: The one searching and proving the true interpretation thereof: The other applying the same paraphrastically and historically to the text. Set foorth by John Napier, L. of Marchistoun younger. Whereunto are annexed certaine oracles of Sibylla, agreeing with the Revelation and other places of Scripture. Edinburgh, printed by Robert Walde-grave, printer to the King's Majestie, 1593. cum privilegio Regali."

Scotland. This blank was now filled up by the writings of Rollock and Bruce. The former published commentaries on the most of the New Testament, and on some parts of the old, which were speedily reprinted on the continent with warm commendations by Beza, and other foreign divines. They are not distinguished for critical learning, although they contain occasional remarks on the original; nor do they discover deep research, but they are perspicuous, succinct, and judicious." * Wallace, Sharp, Cameron, Boyd, the Simpsons, Alexander Hume, and Robert Pont, are all successively reviewed as writers who mark the rise of theological learning. But Napier, the one to whom Pont (among the most learned of those enumerated,) repeatedly refers as a master in the science, is omitted. It is also curious to observe, that while this keen and elaborate research of a modern writer gives us the names of Rollock and Bruce as they who first filled up the blank, not very many years after Napier's death a tract was published in London, entitled "Napier's Narration, or an Epitome of his booke on the Revelation," written in the form of a dialogue, wherein Rollock is made the scholar and Napier the master. † Had his proper place been assigned him, it could no longer be said that the blank in the theological learning of Scotland was filled by writers whose works "are not distinguished for critical learning, nor discover deep research."

The language in which Napier's commentaries on the Apocalypse were composed, though it enables us now to judge more easily of their merits, was at the time highly unfavourable to their promulgation. Latin was then the medium through which learned men endeavoured to enlighten the world and im-

* V. ii. p. 308.—Dr M'Crie particularizes Rollock's *Effectual Calling*, published at Edinburgh 1597, and his Sermons upon the Epistles of Paul, 1599. His first two works were published in 1590 and 1591, immediately before the publication of Napier's Plain Discovery, but have no pretension to a comparison with that profound commentary. Bruce published a few sermons in 1590 and 1591. But it is obvious that these comparatively trifling productions cannot be said to have filled up the blank in the theological learning of Scotland, when such a work as our philosopher's was on the eve of publication; otherwise the palm must be allotted to the puerile production of King James himself; "ane fruitful meditation," &c. alluded to in Napier's letter, and first published in 1588. The doctor's statement (we speak with great deference) ought to have been, that the blank was filled up by Napier's Plain Discovery; a work of profound research and critical learning; containing, moreover, the soundest practical doctrines, and many indications of the finest genius.

† London, 1641.

mortalize themselves; and those who like Napier were constrained from accidental circumstances to adopt the vulgar tongue of their country, generally made a formal apology to the reader for the uncouth and unscholar-like garb in which they appeared before him. It was, as he expressly states, "that hereby *the simple of this island* may be instructed," that our philosopher was "constrained of compassion, leaving the Latin, to haste out in English this present work." But his task was scarcely lightened to himself by doing so. Indeed he seems to have been a little trammelled with the rude and undetermined state of the language of his own country; and doubtful of being able to put his treatises in words, which, while they conveyed his meaning to all classes of his native island, would be recognized by the learned as a language at all. "Whatsoever, therefore," says he, "through haste is here rudely and in base language set down, I doubt not to be pardoned thereof by all good men, who, considering the necessity of this time, will esteem it more meet to make haste to prevent the rising again of antichristian darkness within this island, than to prolong the time in painting of language. Especially, also, seeing herein purposely I press not to follow the particular ornate terms of neither Scottes nor Englishmen; but rather contrarily for both their instructions, I use so much as I can these words and terms that be more common and sensible to them both, than proper or ornate to any one of them." * Afterwards, in his solemn but gentle and deprecating address "to the mislyking reader whosoever," he adds, "I grant, indeed, and am sure, that, in the style of words and utterance of language, we shall greatly differ, for therein I do judge myself inferior to all men; so that scarcely in these high matters could I with long deliberation find words to express my mind; but this imperfection, seeing God perchance sendeth it to make the greater perfection in humility, and to beat down vain glory, and that Moses and many great men have lacked the eloquence of tongue; I trust charitable Christians shall not disdain me therefore, but rather amend the same in their own editions." Such was this great man's estimate of his style and language, the nervous simplicity of which was far superior to the contemporary productions of his own country, and would have done credit to the language of any other.

He was hitherto unknown on the continent; and this treatise had not the advantage of its author's ultimate reputation as a philosopher, to introduce it

* In this and the other passages quoted from Napier in this chapter I have not followed the antiquated orthography.

to the world. Yet it instantly found a translator; and no sooner was that arduous task completed than the work attracted the eyes of the most learned, both of Catholics and Protestants, in Europe.

At this time the famous city of Rochelle was the citadel of the Hugonots in France, and there, as the very heart of the cause, Protestantism was cherished, and even defied the armies of antichrist. Among the champions of the true church in that city resided one George Thomson, a Scotchman by birth, who had become naturalized at Rochelle. According to his own account, he had neither been called to the ministry nor possessed the gift of original composition. "But," says he, "I was nevertheless determined not to be totally useless, or to sit with my hands across during the war of religion, and so I did as they who, having no weapons of their own, snatch those of others, with which they fail not to pierce the enemy." * The weapon he siezed was the work of his countryman, the value of which he instantly appreciated, and determined to translate it into French. "The reasons," he adds, "which led the author of this work to compose it, induced me also translate it,—the zeal, namely, which all of us ought to possess for the glory of God, and the kingdom of his Son," &c. "And I trust that my translation may have even a greater effect than the original, which being hitherto clothed in a language known but to a few, and confined to a land surrounded by the ocean, has never been blazed abroad until now that it is made to speak in a language familiar to Europe. Then, the sound of it had scarcely crossed the ocean, but now it shall awaken Antichrist in his very lair," &c. †

* Translator's preface; "aux Eglises Françoises Reformees tant en la France qu'ailleurs."

† "Ouverture de tous les secrets de l'Apocalypse, &c. Par Jean Napier (c. a. d.) Nonpareil, Sieur de Merchiston, *reveus par lui-meme*, et mise en François par Georges Thomson, Escossois. A la Rochelle, par Jean Brenouzet, demeurant près la boucherie Neufue, 1602."—The translator when he first conceived the project had opened a communication with the author. The commendatory ode attached, has

Hos inter unus, stemmate nobilis
Scotus Napeirus, multa peritiùs
Diviniusque excogitavit,
Auxilio Jehove impetrato.
Quæ, cum Britannis consuleret suis,
Veste expolivit non nisi patria
Paucisque nota, vir disertus, &c.

This translation is well and handsomely got up. Another edition of it appeared at Rochelle

These proud anticipations were not entirely disappointed. The translation attracted great attention throughout the continent. The Protestants bowed as if an oracle had spoken, and the Catholics looked to their champions for a reply. At this time the famous Joseph Juste de la Scala, or Scaliger, swayed the sceptre of letters. He was ten years older than Napier, and may have been known to him abroad. Certainly our philosopher was well acquainted with his writings, and especially with his most important work, the treatise *De Emendatione Temporum*, published at Paris in 1583. This was the first attempt to treat of chronology as a science, and seems to stand in the same relation to history that the Novum Organum of Bacon does to a more extended circle of human knowledge. The noble plan and varied erudition of the work had been deeply studied by Napier, who seems to have taken it as the basis of his own chronology.* Scaliger, though his father died a Catholic, had embraced the Calvinistic doctrines; and at the time our philosopher's work appeared, interested himself deeply in the success of the Protestant church. It would have been exceedingly curious to have found his recorded opinion of Napier's Plain Discovery. The subject of the Apocalypse was one which, sometimes at least, Scaliger professed to consider unapproachable. He praised Calvin for not attempting to fathom it. "None," said he, "has better unravelled the prophets than Calvin, but he was wise to leave the Apocalypse as he found it."† Calvin himself, when asked his opinion on the subject, is said to have declared openly his total ignorance of what that obscure writer would be

in 1605, with some additions by the translator, who, as he advertises the reader, distinguishes these from the original by an asterisk, according to the express injunctions of the author to him. A third edition came out at the same place in 1607.

* Scaliger published several amended editions of this treatise after Napier's Plain Discovery appeared. See an account of Scaliger and his writings in Chauffepié's Supplement to Bayle. Napier in his Commentaries says, "as further I intend, God willing, to set out some time in a little table of chronologies; but, in the meantime, I remit the reader to Josephus Scaliger, *De Emendatione Temporum*, whom I cannot but follow in so far as he proves and demonstrates, and no otherwise."—P. 342, edit. 1611.

† It would appear, from Scaliger's contradictory sayings on the subject, that he had formed no settled opinions upon the merits of the Apocalypse. "Hoc possum gloriari me nihil ignorare eorum quæ in Apocalypsi, *canonico verè libro*, prophetice scribuntur, præter illud caput in quo *væ* septies repetitur." "In Apocalypsi sunt tantum duo capita quæ possunt intelligi," &c. "Calvinus sapit quod in Apocalypsim non scripsit."—*Scaligerana, &c. avec des notes de M. le Fevre et M. de Colomies*, 1695, p. 26.

at.* Such sentiments were equivalent to a denial of the inspired character of that portion of the Scriptures; but, had either of them been conscious of the capacity of producing a treatise on the subject like Napier's, all Europe would have rung with the attempt. There is no doubt of the fact, however, that the Plain Discovery was brought under the special notice of the "Dictator of Letters;" and the perusal may have changed his views considerably as to the propriety of leaving the Apocalypse without a commentary. Scaliger had an intimate correspondent and devoted admirer in one "Jaques Esprinchard," a zealous Hugonot, and apparently a man of learning and considerable weight in Paris. In a letter from him to Scaliger, dated at Paris 5th July 1602, the following passage occurs. "Our churches here and at Guyenne are in a prosperous state, and their daily increase is very perceptible. This enrages our enemies, who would fain involve us in fresh turmoils and thus impede the course of the Gospel, seeing as they do the total ruin of their papal and papistical darknesses near at hand. There is a Commentary upon the Apocalypse in great estimation among us at present. The author is a Scotch gentleman who rejoices in the name of *Peerless*. You must have read it; and therefore I entreat you, Sir, to send me your judgment of its merits, as you know I bow to that more than to the judgment of any other man in the world."† Unfortunately, Scaliger's reply is not to be found in the little rare volume from which the above is derived.

It was not in France only that Napier now became revered. Germany longed for the acquisition of the fruits of his labours; and at the commencement of the year 1627, his Commentaries had gone through their third German edition at

* Valde mi hi probatur Calvini non minus urbana quam prudens oratio, qui de libro Apocalypseos sententiam rogatus, ingenuè respondit, se penitus ignorare quid velit tam obscurus Scriptor. —*Bodin, quoted in Scaligerana*, p. 27.

† "Voyant que le temps approche de la ruine totale de leurs tenebres papales et papables. On faict grand cas par deça d'un Commentaire sur l'Apocalypse qui a pour aucteur un Gentil-homme Escossois, nommé *Nonpareil*. Il n'est pas que vous ne l'ayez leu, c'est pourquoy je vous supplie, Monsieur, de m'en mander vostre jugement, auquel vous sçaurez que je defere plus qu'a homme du monde," pp. 80, 81. Under *Scaliger*, in the Supplement to Bayle, p. 197, I find, "Morhof parle d'un petit Recueil *fort rare* publié par Jaques Revius à Harderwyk 1624 in—8. intitule *Epistres Francoises des personnages illustres et doctes à M. Jos. Juste della Scala*: on y trouve, dit il, l'explication de diverse passages des auteurs classiques, on y consulte Scaliger sur différens points," &c. This is the volume from which the above extract from the letter of Esprinchard is taken; and I am indebted to the kindness and bibliographical knowledge of Sir William Hamilton, Bart. for the perusal.

Frankfort on the Main. It was there entitled "the beautiful and long-wished for Exposition of the Revelations of St John, by John Napier, an excellent Scottish divine," * &c.; and such was the sensation created, that the more learned of the Catholics indicated some intentions of taking the field publicly against its author. In 1611, after three editions had been published at Rochelle and one at Frankfort, another English edition appeared. In his Preface to this Napier states, that, "after the first edition of this book in our English or Scottish tongue, I thought to have published shortly the same in Latin, (as yet, God willing, I mind to do,) to the public utility of the whole church. But understanding, on the one part, that this work is now imprinted and set out diverse times in the French and Dutch † tongues, beside these our English editions, and thereby made public to many; as on the other part, being advertised that our papistical adversaries were to write largely against the said editions that are already set out; therefore I have as yet deferred the Latin edition, till, having first seen the adversaries' objections, I may insert in the Latin edition an apology of that which is rightly done, and an amends of whatsoever is amiss." This threatened hostility on the part of the Catholics never arrived at publication, although the object of it continued to pass through a variety of editions, both at home and abroad. Consequently Napier's Latin work did not appear, and the lightened task descended to *Joseph Mede*.

Such, generally, was the origin and reception of a work most unaccountably neglected in every biographical notice of its illustrious author hitherto attempted. At this Lord Buchan sneered as at a visionary cloud passing over the mind of the Scottish Archimedes, which neither connected him with the history of his country, nor with the triumphs of genius. Dr M'Crie left it unnoticed, while he traced minutely the progress of our learning, from its fountain at St Andrews through Scotland, during the first years of the Reformation. And a more distinguished writer than either has observed, "The sublime genius

* Johannis Napeiri, Herren zu Merchiston, eines trefflichen Schottländischen Theologi, schöne vnd lang gewünschte Ausslegung der Offenbarung Johannis, u. s. w. Nach dem Frantzösischen, Englischen, vnnd Schottischen Exemplaren, dritter Edition, u. s. w. Getruckt zu Franckfurt am Mayn im Jahr 1627, 8vo. Sir David Brewster says, "Newton was well known by the appellation of an 'excellent divine.'"—P. 273.

† By the *Dutch* tongue, Napier here obviously means the German, which was then frequently called Dutch; Dutchland meaning Germany. Dr Mackenzie, in his Lives, says, the Plain Discovery "was immediately translated into Dutch, French, Italian, and Latin." I have not seen the Italian or Latin editions.

which marked by the logarithmic canon the correspondence betwixt arithmetical and geometrical progression, had his weak point. Napier, like Newton, wasted time in endeavouring to discover the mysteries of the Apocalypse, and to ascertain prophecies, which, if intended for our instant comprehension, would (with deep respect we speak it) have been expressed more clearly," * &c. Had all this arisen from the slightest knowledge of Napier's theology, it might have been temerity to illustrate the biography of its author by entering into any details. As it is, we must institute some further examination of a work, which, while it gave an impulse to Religion at a critical period of the Church, and marks an epoch in letters, will be found to contain unequivocal indications of a mind superior in its grasp to every contemporary.†

No perfect account of it can be given more briefly, or in language more distinct than his own:—" Being of purpose," says he, " to expound and open up the mysteries of this Revelation, by a twofold discourse, the one *paraphrastical*, the other *historical*, both confronted together, I have thought good before that work to premit, by way of introduction, a reasoning for the investigation of the true sense and meaning of every notable mystery thereof, and to set the same in form of propositions, as near the analytick or demonstrative manner as the phrase and nature of holy Scriptures will permit," &c. After giving some account of his first inclination to this task, (as we have elsewhere quoted) he proceeds—" Here then, beloved reader, thou hast this work divided into two treatises, the first is the said introduction and reasoning for investigation of the true

* Sir Walter Scott's Provincial Antiquities, 1819.

† Since the above went to press, there has been published "An Historical View of the Progress of the Physical and Mathematical Sciences, from the earliest ages to the present times, by the Rev. Baden Powell, M. A. F. R. S. Savilian Professor of Geometry in the University of Oxford," 1834, being a volume of Dr Lardner's Cyclopædia. In that I find, p. 194, " The intellectual character of Napier exhibits an instance of one of those singular inequalities which not unfrequently characterize high genius. Exact and comprehensive as were his views of mathematical truth, he could not discriminate other kinds; and engaged with all the sober assurance of certainty in a puerile commentary, in which he imagined he had decyphered all the mysteries of the Apocalypse. He died in 1622."

He died in 1617. These cabinet Cyclopædias and Libraries of useful Knowledge will be the ruin of British letters. Where the treatises are original they are not always founded upon research, and where they seem most meritorious, the labours of others have been adopted with just such acknowledgment as may serve to save the honour of the compiler. After repeating Professor Playfair's beautiful eulogy of the Logarithms, Professor Powell adopts an idea of Napier's theological commentaries, apparently not founded upon the most cursory inspection of the work, and certainly upon no critical or historical consideration of its merits.

sense of every chief theological term and date contained in the Revelation, whereby not only is it opened, explained, and interpreted, but also that same explanation and interpretation is proved, confirmed, and demonstrated by evident proof and coherence of Scriptures agreeable with the events of history. The second is the principal treatise, in the which the whole Apocalyse, chapter by chapter, verse by verse, and sentence by sentence, is both paraphrastically expounded and historically applied. This second and principal treatise keepeth this order, that first before every chapter is premitted the argument, not of the literal sense of the chapter, but of the true meaning and interpretation of the same. Thereafter, (seeing all the chapters of the Apocalypse do either describe the vision, or then express the prophecy,) if the present chapter be descriptive, every page thereof is divided into two columns, in the first whereof is set the text by verses; in the second column, is set the paraphrastical exposition, answering verse by verse to the text of the first column; but if the present chapter be prophetical, then is every page thereof divided in three columns; the first containeth the text by verses, the second the paraphrastical exposition thereof, verse by verse, the third, also agreeable therewith by verses, containeth the history or historical application, in the which, and by the which, the same prophecy is or shall be performed; and if any chapter is partly descriptive, partly prophetical, then where it is prophetical, there are three columns; the first is the text, the second is the paraphrastical exposition of the text, the third is the historical application and accomplishment thereof. But wherein that same chapter any part is descriptive, then are there forenent that part only two columns; whereof the first is the text, the second is common to both the paraphrastical column and to the historical column; and therefore it passeth through, occupying the room of both the second and third columns, so that when ye read the second column, ye shall read it with the second column, and when again ye read the third column, ye shall also read it with the third column: for it is such a common thing as agrees to be read with either of them. Furthermore, there is two drawn lines betwixt the paraphrastical column and the historical, within the which lines there is set down the dates of times, by seals, trumpets, vials, thunders, and years of God, answering to the precise time in the which every prophecy thereof was, or shall be performed. Moreover,—in case any part of the text may be thought to be wrong translated, any part of the paraphrase wrong expounded, or finally, any part of the history wrong applied, over briefly handled, not sufficiently proved, or having need of annotations,—I have therefore

forenent every doubtful and needful place of the text, paraphrase, and history, set marks of the ordinary letters of *a, b, c,* &c. in the paraphrase, and after the end of the whole chapter have subjoined notes, reasons, and amplifications, marked correspondently with the like letters of *a, b, c,* &c. by the which notes and amplifications, not only the brevity of the paraphrase and history is supplied, but also by reasons, proofs, and arguments of Scripture therein insert, the whole smaller doubts thereof are resolved. And as toward the greater doubts, they are referred to the first treatise, wherein they are at length and demonstratively proved. So the note here in the second treatise doth only quote the proposition of the first treatise, that proves that present assertion. And because this whole work of Revelation concerneth most the discovery of the Antichristian and Papistical kingdom, I have therefore, (for removing of all suspicion) in all histories and profane matters taken my authorities and cited my places either out of Ethnik authors, or then Papistical writers, whose testimonies by no reason can be refused against themselves. But in matters of divinity, doctrine, and interpretation of mysteries, (leaving all opinions of men) I take me only to the interpretation and discovery thereof, by coherence of Scripture, and Godly reasons following thereupon; which also not only no Papist, but even no Christian may justly refuse. And forasmuch as our Scriptures herein are of two sorts, the one our ordinary text, the other extraordinary citations; in our ordinary text I follow not altogether the vulgar English translation, but the best learned in the Greek tongue, so that (for satisfying the Papists) I differ nothing from their vulgar text of *S. Jerome*, as they call it, except in such places where I prove, by good reasons, that he differeth from the original Greek. In the extraordinary texts of other Scriptures cited by me, I follow ever *Jerome's* Latin translation where any controversy stands betwixt us and the Papists, and that moveth me in divers places to insert his very Latin text, for their cause, with the just English thereof for supply of the unlearned. And hereof it cometh that our quotations are according to the sections and verses of *Jerome's* translation, printed in Antwerp by *Plantine*, agreeing also with the great concordances of *Robert Stephane*. In other texts not controverted, the English text alone is sufficient in a Scottish or English treatise, and therefore omit we the Latin. Further, as concerning my citations of ancient and unsuspect writers, I have chosen the same out of the most old and faithful copies, chiefly those that be found in old Popish libraries and imprinted by Popish printers. But as for the new copies and latter editions, there is a malicious ordinance observed in these latter days, by the which the

Friers of *Lovane*, and other Papistical correctors, eiketh, paireth, and perverteth all good and rare books, causing first one sort of them to be imprinted under their testimonial, so that (as that same testimonial therein imprinted beareth) nothing is left therein that may be contrarious to the Roman Church, although the author by his true edition had never so much inveighed against Rome. Thereafter all the remnant Popish printers do follow these new perverted copies in their latter editions without any testimonial, as being warranted by the said first testimonial, and this is most evident to be seen by their books entitled *Index Expurgatorius*. Praying, therefore, all good men to beware of these, we desire earnestly with our hearts so to proceed hereinto, that truth may come to light, and that such grounds may be laid, as thereby the ignorant and simple reader may be best instructed, the Godly and learned Christian most surely confirmed, and the arrogant and obstinate calumniator ratherest confounded and put to silence. But forasmuch as this our good intention and Godly purpose doth always proceed of a very tender and frail vessel; and that as all liquors, how precious soever, do take some taste of their vessels;* so this holy work may in some things, though not espied by myself, taste of my imperfections. Therefore, humbly I submit these imperfections whatsoever to the gentle correction of every wise and discreet person, who in the motion of God's spirit judgeth uprightly, without envy or partiality, praying all good men to have me apardoned of whatsoever is amiss. For although I have not done herein perfectly as I would, yet zealously as I could, knowing that the poor widow's mite was acceptable unto the Lord. For man hath not gold, silver, silks, and purple to offer to the work of the Sanctuary,—to me (as saith Jerome) it shall be much if I may purchase wool or flocks to offer to that holy work. And surely this that I have, how small soever it be, till God enlarge me with more, I offer it gladly unto the glory of God and edification of his true church. To God, therefore, the disposer of this and all other Godly works and meditations, who liveth and reigneth eternally in Trinity and Unity, be glory, praise, laud and thanks, for ever and ever, *Amen*." †

Having thus disclosed his method, he proceeds to the introductory treatise, being the ground-work of his exposition. His first object is to demonstrate the meaning of "dates and chief reckonings hid under terms." These terms are either "vulgar and used," or "new and strange." This division compre-

* Lord Bacon used somewhere the comparison, "like as waters do take tinctures and tastes from the soils through which they run."

† Compare this conclusion with the prayer printed in capital letters at the end of Mr Cunningham of Lainshaw's introduction to his Dissertation on the Apocalypse. 1832.

bends his chronology both as to its language and computation. How, for instance, under the vulgar terms, a day in prophetical language is taken for a year, a week for seven years, &c.; what is meant by a time, times, and half a-time; and how under the new or strange terms (such as the seven seals, trumpets, and vials,) the history of the church may be traced, and the latter day itself nearly computed. The second object of this preliminary treatise, are the "affairs and chief matters concerning God's servants; and God's greatest enemies." As to the former, he demonstrates that the Church,—Religion,—the two Testaments,—the Books of the Old and New Testaments,—are signified by God's temple,—his throne,—the two witnesses,—the twenty-four elders,—and the four beasts. As for "God's greatest enemies," that opens the wider field of "Sathan" and the "wicked kingdoms." Sathan,—the time and nature of his bondage. The wicked kingdoms, as signified under the terms Gog and Magog and the two beasts; Gog and Magog being the Papists and Mahometans, and their armies indicated in the sixth trumpet and vial. Of the two beasts, the one with two horns is Antichrist, who is proved to be the Pope, and the time of his reign computed; the other, with ten horns, signifies the whole Latin or Roman empire from which Antichrist descends,—Rome being figured under Babylon. Lastly, the image, the mark, the name, and the number of the ten horned beast are all successively explained and demonstrated. The *image*,—being the degenerate Roman emperors; the *mark*,—being the league of servitude professed to the Romans by their subjects, and afterwards marked by the Pope with the visible mark of χς and crosses of various kinds; the *name*,—being λατινος or the Latin empire; and the *number*,—being 666.

It is obvious, that, if all this be clearly demonstrated, the promise of "a Plain Discovery of the whole Revelation of St John" is well-nigh fulfilled. Accordingly our author seems to have arranged and supported his premises at the expence of vast research and deep contemplation. This he does in a series of thirty-six short propositions, each followed by its own chapter of elaborate proofs, but in a condensed form, and disfigured with none of those long controversial digressions that rendered the continental commentators who preceded him so unwieldy and useless.

It would far exceed the limits of a chapter of his biography to enter into the details of these propositions so as to do justice to their ingenuity and erudition. Indeed, we would despair of being able to afford a view of their contents in clearer and shorter terms than the treatise itself. One of his

propositions, however, demands a few observations, being the only part of his work that has obtained popular notoriety. That Napier predicted the latter day to fall about a period now long past, may be considered the amount of any knowledge of his theological writings possessed even by the learned of our times. This *error calculi* may be presumed to have occasioned the disregard of his Commentaries already noticed, and is, perhaps, the reason why Biot and Brewster, in their analysis of the corresponding production of Newton's mind, have not adverted to Napier. And we can only account for the fact, that both of the Newtons, and other more modern apocalyptic commentators, never among their numerous authorities refer to the Scotch philosopher, by supposing that the repute of his having failed in an attempt to ascertain the day of judgment, deterred these authors from seeking out his treatises which have become rare. As there is great misapprehension on the subject, it becomes the duty of his biographer to redeem his memory from those vague ideas of something weak and wild pervading the whole of his exposition; which, in truth, are much rather the characteristics of that species of composition in the present century.

By his first proposition, Napier lays down, that " in prophetical dates of days, weeks, months, and years, every common prophetical day is taken for a year." His second is the sychronical proposition, that " the seven trumpets of the 8th, 9th, and 11th chapters, and the seven vials of the 16th chapter are all one." In his third, he maintains that the pouring out of the fifth vial, or the sounding of the fifth trumpet, was in Anno Domini 1051, when the Turks began their dominion under Zadok; and in his fourth, that " at the sixth vial and trumpet, the four Mahometan nations began their empire Anno Domini 1296."—" Therefore, the fifth trumpet or vial endured from the 1051 year to 1296 years, which is the space of 245 years." He then demonstrates by his fifth proposition, " that every one of the rest of the trumpets or vials doth contain the same space." Upon these propositions he builds his sixth, that " the first trumpet or vial began at the jubilee in Anno Christi 71." His eighth and ninth are devoted to fixing the times and spaces of the seals; and his tenth is that which first touches the duration of the world. As the necessary consequence of his premises, that proposition is, that " the last trumpet and vial beginneth Anno Christi 1541, and *should end* in Anno Christi 1786."—" Not," says he, " that I mean that that age, or yet the world, shall continue so long, because it is said that, for the Elect's sake, the time shall be shortened; but I mean,

that, if the world were to endure, that seventh age should continue until the year of Christ 1786." The eleventh and twelfth propositions fix the signification and times of the seven thunders; and the thirteenth is, that "Every one of the first three thundering angels containeth a jubilee, and then the last four all at once completeth the day of judgment." Such are the steps by which our philosopher was led to lay down his fourteenth proposition, that "the day of God's judgment *appears to fall* betwixt the years of Christ 1688 and 1700."

We have thought it necessary to trace them, because an idea prevails that Napier's dictum on the subject was of the nature of those wild denunciations, springing from an overheated imagination, which pretended (like John Knox) to supernatural perceptions of the future. But the fact is far otherwise. Napier had arranged his chronology upon authorities which he considered infallible; and having determined, as he supposed, certain points of time, or nearly so, the process of calculation was then simple, and the attempt inherent in his nature, as (if we may borrow the poet's attribute)

"He lisped in numbers, for the numbers came."

The argument which supports his fourteenth proposition is too long to quote, but may be safely referred to as an evidence of the *healthful* state of mind and soul in which it was propounded. Looking, as all such commentators must do, to the signs of his times, and impressed, as they generally are, with a belief that to the turbulent elements of his own times the language of the Apocalypse was more applicable than to any other, he concluded that the end of all things was not far distant. This idea has been so prevalent in every age, including that of the Apostles themselves, and is so natural to those who study the subject deeply, that to infer from it an unsound state of mind would argue little knowledge of books or human nature. It is from the individual's mode of treating that conclusion, rather than from the conclusion itself, that his weakness or wildness is to be discovered. Impressed with such a feeling, Napier reasons in a manner that cannot be impugned. He refers to the text, "But of that day, and that hour, knoweth no man, no not the angels which are in Heaven; neither the Son, but the Father." His argument, however, from the same chapter, it is not easy to refute, that Christ's knowledge only yields to that of the Father in respect of the

precise day and hour; and that the Son was even careful to instruct his servants, that they might know the signs of the approaching end. He compares this design to our knowledge of the approach of death, which, for obvious reasons, is concealed from view, though to some it becomes apparent when near at hand; and he adds, "To what effect were the Prophecies of Daniel and of the Revelation given to the Church of God, and so many dates of years and circumstances of time foreshewing the latter day contained therein-till, if God had appointed the same to be never known or understood before that day come." He also quotes Daniel; "Saith Daniel of the time of revelation, 'Signa librum ad tempus statutum, multi pertransibunt et multiplex erit scientia.' Seal the book till the appointed time; many shall go to and fro, and knowledge shall be increased." And we cannot deny his right to lay stress upon such a text, who at the very time was conscious of conceiving that great revolution in the science of numbers, whose effect upon navigation was appreciated the instant it appeared.

How little, after all, does his language on this momentous subject differ from Sir Isaac Newton's, who wrote a century later? "In the very end," says the English philosopher, "the prophecy should be so far interpreted as to convince many. 'Then,' saith Daniel, 'many shall run to and fro, and knowledge shall be increased.'—'For the Gospel must be preached in all nations before the great tribulation,' &c. But if the last age, the age of opening these things, be now approaching, *as by the great successes of late interpreters it seems to be*, we have more encouragement than ever to look into these things. If the general preaching of the Gospel be approaching, it is to us and our posterity that those words mainly belong, 'In the time of the end the wise shall understand, but none of the wicked shall understand.'"* It will be obvious to any one who compares their respective treatises, that Napier, even upon the problem of the last day, is no more wild and visionary than was Newton. The former, who, it must be remembered, belonged to a very different age and state of the Protestant church, is more precise and courageous in his examination of this mystery than the latter, comes more to par-

* Sir Isaac Newton's Observations on the Apocalypse of St John.—*Newtoni Opera*, Tom. v. p. 448. 4to. 1785.

ticulars, and even commits himself by hazarding a conjectural computation of the period. But Sir Isaac Newton, with the immense advantage of a century's additional light and additional experience,—with the Commentaries of Mede betwixt him and Napier,—hazards the very same conjecture of the end of all things being at hand, wields the very arguments of Napier, and quotes the same texts to prove, that "if the general preaching of the Gospel be approaching, it is to us and our posterity that those words mainly belong, 'in the time of the end the *wise shall understand*,' &c." The difference betwixt them is merely this, that Napier, upon comparing his chronology of the world with the signs of his times, supposed that the period of "understanding" had arrived; while Newton only gathered from his comparison, that "the age of opening these things" was approaching. The one accordingly perilled a calculation; the other said, there was "*encouragement* to look into these things."

It is in his chronology that we must look for the weak point of Napier's admirable commentary. But this does not prove him a visionary, unless all commentators on prophecy be called so. Every one of them, not excepting Sir Isaac Newton, are lost in their chronology, which seems to be the impassable gulf betwixt these mysteries and mortal interpreters. The learned Mede, who followed Napier, and still occupies the *cathedra* of theological science in England, toiled over the question, how long the world should last, and came, after infinite labour, to a conjectural and useless conclusion. In despair, however, at the delusive nature of ancient chronology, he suggests the idea, "whether there may not be some secret disposition of Divine Providence in this variety of computation, to prevent our curiosity in counting the exact time of the day of judgment." * Napier identified the "time, times, and half a time" with the 1260 *prophetical* days and *actual* years; and maintained that these were the years of Antichrist's reign over Christians, commencing "about the year of Christ 300 or 316 at the farthest," and ending with the destruction of the "Papistical policies" in 1560. Mede, who was born only thirty-six years after Napier, and quotes him, adopts his interpretation of the 1260 days, but dates their commencement about the year 456. Sir Isaac Newton repeats the very commentary of Napier on this prophetical period, but gives the year 794 as his nearest

* The works of Joseph Mede, B. D. fol. 1677, containing, *inter alia*, "In Sancti Joannis Apocalypsin Commentarius," &c. The fifth Book contains Miscellanies, the third chapter being, "Answer concerning a Discourse, &c. that the world should last 7000 years," &c.—See page 895 for passage quoted. "Napeirus" is quoted by Mede as a high authority.

approximation to the commencement. Bishop Newton does not quote Napier. His interpretation, however, of " a time, times, and half a time," is precisely the same; and then he adds, " To fix the time exactly when these 1260 years begin, and consequently when they will end, is a matter of some niceness and difficulty; and perhaps we must see their conclusion before we can precisely ascertain their beginning." In this there was much sense; but after he had decided that fixing the commencement so soon as 456 " was the capital error of Mr Mede's scheme, which hath led him and others who have followed his example into subsequent errors, and what the event hath plainly refuted," the bishop ventures, through the usual labyrinth of historical coincidences, to peril his own conclusion, no doubt to be refuted in its turn. " What appears," says he, " to be most probable is, that it is to be dated from the year 727, when, as Sigonius says, Rome and the Roman dukedom came from the Greeks to the Roman pontiff." * Much more might be said, not only to exonerate our philosopher from vague imputations of being visionary beyond the rest in his theological speculations, but to place him at the head of those illustrious English divines, who are acknowledged to be the lights of a school, in which, however, they did not excel its founder, Napier. But we must now pass rapidly over the rest of his work, or, at least, with such notices as will suffice to support what may appear a bold proposition.

His second and chief treatise contains the Apocalypse itself, arranged with a paraphrastical version and historical application in separate columns, with commentaries at the end of each chapter, according to the plan announced in his preface. What is much to be admired in the structure of the work, and affords a good picture of Napier's mind, is the compression of so minute an analysis of the whole Revelations, accompanied with reasoning so constant and close, and erudition so varied, within the space (in the most amplified edition) of a small quarto, less than 400 pages. The philosopher was well characterized by his son, when he said, " It was the opinion of the best judges, that my dearest father, among many rare gifts, was unrivalled in this, that he could extricate, in the fewest words, the most difficult matters by some sure and simple method." † The task he so ably performed in this commentary was one of Hercu-

* Dissertations on the Prophecies, by Thomas Newton, D.D. late Lord Bishop of Bristol. Vol. iii. p. 244. 8vo. edit. 1802.

† Patri charissimo, in quo, ex optimorum hominum sententia, inter alia præclara hoc eximii

lean labour, and in his hands perfectly original. When we consider the state in which he found scientific theology, and the passions and prejudices which surrounded his subject, we must be struck with the wonderful resources of his clear and powerful intellect, so far in advance of his time. It was comparatively easy, with such an example before him, for the learned Mede to compose his ponderous treatise. Nor can we help surmising that the "Clavis et Commentationes Apocalypticæ" derived a hint at least from Napier's declaration, that he considered his own exposition imperfect, and merely as paving the way for more extended commentaries in Latin.

In Mede's celebrated work a method has been adopted with regard to the order and connection of the apocalyptical visions, the principal of which the author thus explains:—"The Apocalyse, considered only according to the naked letter, as if it were a history and no prophecy, hath marks and signs sufficient, inserted by the Holy Spirit, whereby the order, synchronism, and sequel of all the visions therein contained may be found out and demonstrated, without supposal of any interpretation whatsoever. This order and synchronism thus found and demonstrated, as it were by *argumenta intrinseca*, is the first thing to be done and forelaid as a foundation, ground, and only safe rule of interpretation, and not interpretation to be made the ground and rule of it." The editor and biographer of Mede says:* "The glory of the first discovering these synchronisms is peculiarly due to Mr Mede; and upon this score shall the present and succeeding ages owe a great respect and veneration to his memory," &c. But we must do our own philosopher the justice to observe, that, long before Mede, he adopted that very principle (though in a form so simple and unaffected that those who run might read) for the developement of his plain discovery. To each of his treatises tables are attached, occupying a single page, and where at a glance, the nature, order and connection of the whole Revelations may be discovered. He fixes the essential synchronisms, both of dates and terms, in his preliminary propositions; and has even done so in an instance where Mede had failed. "Mr Mede," says Sir Isaac, "hath explained the prophecy of the first six trumpets not much amiss; but if he had ob-

eminebat, res difficillimas methodo certâ et facili quàm paucissimis expedire."—*Preface to the Canonis Constructio edited by Robert Napier*, 1619.

* See the Life of Mede and account of his works at the commencement of the volume already referred to.

served that the prophecy of pouring out the vials of wrath is synchronal to that of sounding the trumpets, his explanation would have been yet more complete."* Now Napier carries this synchronism so far, as in his second proposition to "conclude both those trumpets with those vials, and also the rest of the trumpets with the rest of the vials respective, in purpose, meaning, time, and in all other circumstances to be one and the self-same thing."†

That the best part of all the celebrated apocalyptic commentators who are quoted and looked up to in modern times is to be found in Napier, might be proved by a series of comparisons of the important passages in each, chronologically arranged. This would far exceed our limits. The object, however, being to assert his right to the throne of scientific theology in Scotland, no less than of mathematical science; and his right of priority at least over Mede and the Newtons, it is hoped that a few more comparisons will be excused.

The department of Sir Isaac Newton's theological works in which he is held to be most original and profound is his system of chronology. "Among the chronological writings of Sir Isaac Newton," (says his biographer, Brewster,) "we must enumerate his letter to a person of distinction who had desired his opinion of the learned Bishop Lloyd's hypothesis concerning the form of the ancient year. This hypothesis was sent by the Bishop of Worcester to Dr Prideaux. Sir Isaac remarks, that it is filled with many excellent observations on the ancient year; but he does not "find it proved that any ancient nations used a year of twelve months and 360 days without correcting it from time to time, by the luminaries, to make the months keep to the course of the moon, and the year to the course of the sun, and returns of the seasons and fruits of the earth," &c.‡ In like manner Sir Isaac, in his "chronological observations upon the years used by Daniel," has these observations. The ancient solar years of the

* Opera, v. 474.

† *Synchroni motus sunt, qui simul et eodem tempore fiunt.* Esto quod B. moveatur ab A. in C. eodem tempore quo ℭ moetur ab α in γ dicentur rectæ A C, et $\alpha\,\gamma$ synchrono motur describir. —*Napier.*

Synchronismum vaticiniorum voco rerum in iisdem designatarum in idem tempus concursum; quasi contemporationem dixeris et cœteneitatem: Prophetiæ siquidem de rebus contemporaneis συγχρονίζει.—*Mede*, p. 419.

Synchronism. Concurrence of events happening at the same time.—*Johnson.*

‡ Brewster's Life of Newton, p. 268.

eastern nations consisted of 12 months, and every month of 30 days: and hence came the division of a circle into 360 degrees. This year seems to be used by Moses in his history of the flood, and by John in the Apocalypse, where a time, times, and half a time, 42 months, and 1260 days, are put equipollent. But in reckoning by many of these years together, an account is to be kept of the odd days which were added to the end of these years. For the Egyptians added five days to the end of this year; and so did the Chaldeans long before the times of Daniel, as appears by the era of Nabonassar: and the Persian magi used the same year of 365 days, till the empire of the Arabians. The ancient Greeks also used the same solar year of 12 equal months or 360 days; but every other year added an intercalary month, consisting of 10 and 11 days alternately."

How many are there (such as Sir David Brewster) well acquainted with all these passages in Sir Isaac's works, who are yet not aware that the Scotch philosopher had the sagacity to perceive in his subject the necessity of clearing the very matter which, a hundred years afterwards, came under the consideration of such men as Newton, Lloyd, and Prideaux: and that he did so in words very nearly the same, and certainly as distinct as those of the great English philosopher. Napier's 15th proposition contains the very synchronism quoted above. He says "The 42 months, a thousand and two hundreth and threescore prophetical days, three great days and a-half, and a time, times, and half a time, mentioned in Daniel and the Revelation, are all one date;" and then enters into the details, in nearly the words and order observed by Sir Isaac Newton, but perhaps with still greater precision. "Every month among the Grecians contained thirty days precisely," &c. "twelve months in the year, and thirty days in every month," &c. For confirmation whereof it is to be understood that the first institutors of time, to wit the Chaldeans, Grecians, and astrologers, in their directions do agree with this description of time; for they divide the equinoctial into 360 degrees, and attribute a year for every degree of their directions, whereby the whole time of the great revolution or direction of the whole equinoctial will be 360 years," &c. "But now although it is proved these dates to be 1260 years, yet forasmuch as 1260 of Grecian years are but 1242 Julian years, and 8 months or thereabout; and 1260 Julian years are 1277 and a half of Grecian years, making thereby near 18 years difference; it rests therefore to prove *what kind of years these be.* These, we say, are common Julian years for two causes. *First,* although the Grecian common year contained but 12 months, and 30 days in every month, yet do they adjoin certain

intercalar days, which doth make every year overhead to contain 12 months, *five days and a quarter*, which is 365 days and a quarter; and so consequently are overhead equal with our common Julian year. *Secondly*, among the Hebrew prophets, where a day is taken for a year, although the common year contain but 12 months, yet almost every third year, they adjoined an intercalar month by doubling the month *Adar*, which made their Hebrew years overhead equal also with our Julian years," &c.

The similarity apparent in the train of thought of these two chief philosophers of the sister kingdoms is very interesting, and has been little observed. "Know you the meaning," (says Sir Isaac in the postscript of a letter to Locke,*) "of Dan. x. 21,—there is none that holdeth with me in these things but Mich. the Prince?" Napier, too, saw the propriety of a commentary upon this name, and Newton might have found in the Plain Discovery a dissertation upon the very question he put to Locke. Napier says, "Michael is taken for one of the persons of the Trinity," &c. "with the name of Michael,—which is to say, *who is like God*, or otherwise *Deus percutiens*, a beating or striking God,—doth both the person of Christ and the Holy Spirit agree," &c. "The question, therefore, is, which person of the Deity doth Michael signify?" &c. and then, through proofs which it is unnecessary to quote, Napier arrives at the conclusion, that the Michael of Daniel and St John is the Holy Spirit that helped Christ, and not Christ himself.

Sir Isaac devotes the second chapter of his commentaries to "the prophetical language," of which he there affords the key. Upon this M. Biot † remarks very justly, that Newton is not original in the idea or nature of these explanations, though he is so in the plan of establishing his glossary by a preliminary chapter, which enables him afterwards to make a quicker progress by simply placing a prophetical term beside its explanation. Napier has not adopted this plan; but that arises from the circumstances, that his work is more thoroughly digested,—more systematically and philosophically arranged,—and more complete in all its parts than Newton's. The commentaries of the latter consist of desultory essays upon certain points, and are therefore called "observations" merely. He could have made no progress had he not, in the first instance, given his explanations of the prophetical language, as he must otherwise have paused to explain at every step of his observations. But Napier, after his thirty-six fundamental propositions, gives the whole version of the Apocalypse

* See Newton's Correspondence with Locke, published by Lord King.

† See Biot's Life of Newton, in the "Biographie Universelle."

parallel with the paraphrase and application; and then supports his interpretation of the text with notes and illustrations. In this manner there is a glossary to each of the chapters, and he explains all the terms and figures even more minutely than Newton has done. The English philosopher seems to have followed precisely the same explanations, as the curious may see by comparing their respective works.

Newton commenced his observations on the Apocalypse by declaring, that "the folly of interpreters hath been to foretell times and things by their prophecy, as if God designed to make them prophets;" and that the only legitimate province of human interpretation was to illustrate the prophecy when fulfilled, by comparing it with the event. Now this is precisely the nature, generally, of Napier's work, and Newton's censure has no application to him. For the English philosopher expressly admits, (in a passage we have quoted,) that a time of "understanding," *i. e.* of foretelling the actual approach of the latter day was nigh; and certainly he could not mean that *that* knowledge was only to be exercised *after the event had arrived.* And even with regard to his preliminary caution, it did not escape the Catholic eye of his biographer Biot, (though the Protestant one of Brewster might wink at the inconsistency,) that Newton "entraîné lui même au de la limites qu'il avait d'abord assignées aux interpretes, il se trouve aussi *predire* comme eux l'epoque de la chute, au du moins du declin de cette domination temporelle." Our own philosopher, who gathered from the signs of his times that the end was at hand, must, therefore, upon the principles laid down by Sir Isaac Newton himself, stand exonerated in hazarding a calculation which, amid the erudition and practical Christianity of his work, is like a spot on the sun. *

One effect of that work in his own country is very perceptible,—namely, the impulse it gave to the train of theological learning which succeeded it; but from all connection with which Dr M'Crie has tacitly excluded him.

* It is curious to observe the coincidences betwixt Napier and Newton. When the Protestant privileges were attacked by James II., who endeavoured to force an unlettered monk upon Cambridge, Newton, who was a great Protestant champion there, was chosen to be one of the delegates sent to remonstrate, which they did with success. This forms a pendant to Napier's mission to James I. Then both philosophers viewed the Apocalypse through a mental eye of the same construction, and put forth commentaries. I do not think Newton ever read the Plain Discovery, yet some of his pages seem as if borrowed from it. Newton arranged a chronology for himself. Napier declared it was his intention to do so. Napier explained his Logarithms by the idea of lines generated by moving points, "fluxu puncti." Newton, too, regarded lines as generated by the motion of points, and thus arrived at what he termed *Fluxions.*

Napier's friend and pastor, Robert Pont, was, like the philosopher, impressed with an idea that the world was departing,—that the hour of understanding was come. But he too was gifted nevertheless with a powerful and penetrating intellect, was not carried by his own imaginings, and possessed a mind as composed as if it never wandered from its mathematical demonstrations. The consequence was, that he in like manner produced works in aid of theological science, seasoned, no doubt, with a sprinkling of mysticism, but characterized by profound and philosophical learning. These are written with the same view, and in the very tone of the Plain Discovery; issued from the same press when Napier's Commentaries were in their first repute; and probably were matured under his advice and inspection. In 1599, Pont's chronological work made its appearance, entitled, "A newe treatise of the right reckoning of yeares and ages of the world, and men's lives, and of the state of the last-decaying age thereof this 1600 yeare of Christ," &c. In imitation of his friend, he sets forth this treatise in a series of propositions, supported precisely in the same manner, with condensed but recondite dissertations. He prefaces, too, that the exigencies of the times "moved me to publish this treatise in our English tongue;" and he refers, like Napier, "to my more ample discourse to be set out in Latine." He also arrives at within one year of the same conclusion as to the duration of the world, and gives it very nearly in our philosopher's words. The seventh and last trumpet, says he, "will extend to the year of Christ 1785 years, if the world shall continue so long. But the time, by great probabilitie and good arguments, is to be abbreviate for the elect sake." And when he comes to illustrate his propositions with the mysteries of the Apocalypse, he says, "Whereanent I wil remit the readers to the profound and learned Commentaries of John Naper upon the Revelation, wherein the accidents of everie particular period of time, both in the one estate and the other, are set out at large." It was not until the year 1619, after Napier's death, that Pont brought out his more elaborate Latin treatise entitled, "De Sabbaticorum annorum periodis chronologica a mundi exordio," &c. a work of great learning, and worthy of the high reputation of this "aged pastour in the Kirk of Scotland." In this, too, he leans upon Napier; "Ut rectè observat Naperus, et cum eo alii docti;" and calls him, as we have elsewhere noticed, "Apprimè eruditum amicum nostrum fidelem Christi servum."

But the success of Napier's Commentaries seems to have excited the Scottish bishops and Episcopal divines to similar attempts; and he was followed,

at no distant period, by Patrick Forbes of Corse,* afterwards Bishop of Aberdeen, and William Cowper, Bishop of Galloway. The production of the former is a long dull argument of 256 quarto pages, critical rather than learned, and written in such barbarous English as to be nearly unintelligible. The version of the Apocalypse is not given; and we look in vain for the philosophical arrangement, the varied illustrations, and the beautiful practical expositions of Napier's Plain Discovery. Like that, it commences with an "Epistle Dedicatorie" to King James, (but a very fulsome production,) and with an address to the Christian reader. It is decidedly a step backwards, and not in advance, from the mode of investigation developed by our philosopher.

The Commentary by the Bishop of Galloway is a most respectable monument of the theological science of the age, and a much more readable production than the work of Forbes; being clearer, less verbose, and in good English. It is a mere sermon, however, or series of discourses, as compared with Napier's. It is rich, however, in a gem of a commendatory poem, which we cannot resist quoting, both from its beauty and the name that owns it.

To this admired discoverer give place,
  Ye who first tam'd the sea,—the winds outran,—
And matched the day's bright coachman in your race,
  Americus,—Columbus,—Magellan.
It is most true that your ingenious care
  And well-spent pains, another world brought forth
For beasts, birds, trees, for gems and metals rare,
  Yet all being earth, was but of earthly worth.
He a more precious world to us descries,
  Rich in more treasure than both Inds contain,—
  Fair in more beauty than man's wit can feign,—
Whose sun sets not, whose people never dies.
    Earth should *your* brows deck with still verdant bays,
    But Heaven crown *his* with stars' immortal rays.

"*Master William Drumond of* † *Sawthorn-denne.*"

* "An learned Commentarie upon the Revelation," &c. "by Patrik Forbes of Cotharis, printed at Middleburg by Richard Schilders," 1614. Dr M'Crie has not overlooked him. "The most learned of the divines who embraced Episcopacy received their education during this period. Patrick Forbes of Corse, the relation and scholar of Melville, and who afterwards became Bishop of Aberdeen, wrote an able defence of the calling of the ministers of the Reformed Churches, and a Commentary on the Revelation."—*Life of Melville*, ii. 316.

† The celebrated poet and historian. It may be presumed that *Saw*thorn is a misprint for *Haw*thorn.

The most interesting pages of the bishop's volume are the short notices he has given of the writers upon the Apocalypse whose works he had consulted. From this we may perceive that Napier had many imitators both in Britain and abroad. Of our philosopher he thus speaks: "John Napeir, Laird of Merchistoun, our countryman; worthily renowned as *peerelesse* indeed for many other his learned workes, and *specially* for his great paines taken upon this book out of rare learning and singular ingene, which are not commonly found in men of great ranke. *Cotterius* gives him great praise, but takes it backe again too suddenly to himselfe. He compares the Revelation to a golden mine. *Naiperus aurifodinam invenit, Vignerus ostendit, Ego vero aurum inde erui.* Naiper *found it*,—Vigner hath shewed it,—but I (saith he) 'have digged and wrought the gold out of it.' He hath resolved this booke by a marveillous artifice, that it is not unlike a building standing upon six and thirty proppes or pillars. These are his *propositions*, so ingenuously indented, and combyned one with another, that the fall of one imports the destruction of all. Most certaine it is, that his paines have been exceeding profitable for the discovering of many hard and obscure places of this prophecie." *

It is perfectly obvious then, that Napier must be regarded as the illustrious founder of that best school of scientific theology which Bacon desiderated in his *Augmentis Scientiarum*. We claim for our countryman this honour, even before Mede, Sir Isaac Newton, and Bishop Newton; and, considering his priority and originality, would be entitled to do so even if his Plain Discovery could not bear a strict comparison with their commentaries.

* "Pathmos, or a Commentary on the Revelation," &c. "by Mr William Cowper, Bishop of Galloway. London, 1619." Nor has Dr M'Crie overlooked him. He says his discourses "are superior to perhaps any sermons of that age. A vein of practical piety runs through all his evangelical instructions,—the style is remarkable for ease and fluency,—and the illustrations are often striking and happy. His residence in England may have given him that command of the English language by which his writings are distinguished."—*Life of Melville*, ii. 316. Yet Napier's Commentaries display a more nervous style than Cowper's, and excel them in every thing else. Dr M'Crie, however, had not observed Cowper's Commentaries, which is a pity, as it would have led him to Napier's. He narrates an amusing anecdote of this Bishop. An old Presbyterian woman came from Perth to Edinburgh to scold him for taking a bishoprick. She found the Bishop in state, in a fine house. "Oh, Sir, what's this? And ye ha' really left the guid cause and turned prelate!"—"Janet, (said the Bishop,) I have got new light upon these things."—"So I see, Sir, (replied Janet,) for when ye was at Perth ye had but a'e candle, and now ye've got twa before ye; that's a' your new light."

The name of Bacon suggests a view of this monument of Napier's genius, which shows not only how important it is to his own biography, but how honourable to the literary character of Scotland. In the midst of his scientific pursuits, and when his soul was imbued with the mysterious stores of Numbers, our philosopher brought his theological work to light. It is a mistake, as we shall afterwards see, to suppose that mystical theology was the study upon which the years of his manhood were "wasted;" and that only in the decline of life did he redeem the time with science and Logarithms. The true statement of his occupations is, that he at once assailed the strongholds in which human knowledge was confined, at two separate points where the barriers were most formidable. FRANCIS BACON, Napier's immortal contemporary, and just ten years younger, was about the same time reviewing those strongholds with a glance so comprehensive, that nothing could escape its penetration. "He surpassed," says his elegant eulogist, "all his predecessors in his knowledge of the laws, the resources, and the limits of the human understanding. The sanguine expectations with which he looked forward to the future were founded solely on his confidence in the untried capacities of the mind; and on a conviction of the possibility of invigorating and guiding by means of logical rules, those faculties which, in all our researches after truth, are the organs and instruments to be employed."* In reviewing ecclesiastical history, Bacon distinguishes the history of prophecy. "It forms," says he, "the second part of ecclesiastical history, and consists of two relatives, the prophecy and the fulfilment. Hence it ought to be founded on this principle, that every scriptural prophecy be compared with the event, and this through all ages, not only in confirmation of the faith, but in order to establish a certain discipline and skill for the interpretation of those prophecies whose accomplishment are yet to come. This department I mark as deficient, yet it is of a nature to be treated with great learning, sobriety, and reverence, or not at all."† In reviewing the department of mathematics, the same master mind observes of the most recondite branch of the abstract science, "in arithmetic there is still wanting a sufficient variety of *short and commodious*

* Dugald Stewart's Dissertation.

† *De Augmentis Scientiarum*, lib. ii. c. xi. Vol. vii. p. 141. edit. 1819. "Ad instituendam disciplinam quandam et peritiam in interpretatione prophetiarum, quæ adhuc restant complendæ." —"Hoc opus desiderari statuo, verum tale est, ut *magna cum sapientia sobrietate et reverentia* tractandum sit, aut omnino dimittendum."

methods of calculation, especially with regard to progressions, whose use in physics is very considerable." * A few years before Bacon had promulgated these observations, the retired and contemplative Scotch philosopher had endeavoured to supply from the resources of his single mind both these deficiencies. With a mental eye of equal penetration, and only not so excursive because a higher intellectual power impelled him to conquer where it dwelt,—he saw how much was wanting, and instantly set himself to supply what he could. While he toiled to institute " disciplinam quamdam et peritiam in interpretatione prophetiarum," he was continually extracting from the infinite play of numbers the most hidden and precious secrets of logistic. If the writings of Mede, Sir Isaac Newton, and Bishop Newton, have filled the department of prophecy, so that Bacon could no longer pronounce it deficient,—even before he spoke, Napier had founded that very school by a work which may compete with their most elaborate productions. If the *Virgulæ*, the *Scacchia*, the *Lamnæ*, and the *Logarithms*, can be called such variety of compendious methods of calculation as Bacon desiderated, the glory is all due to Napier; and even before the " the prophet of the arts," had spoken, the destiny of NUMBERS was fulfilled by a mind mightier than his. †

To have founded a school of mysticism would be little merit in a philosopher. Had Napier only (though with success) attempted to demonstrate that the Pope was Antichrist, and had calculated to a day the final judgment, he would have been, after all, no great benefactor of his race. But he is not the less so for having failed in some of his speculations, if it be true that he was the first to imbue such recondite studies, with plain and practical expositions of the Christian scheme; that he was the first to bring the light of a true phi-

* In arithmeticis autem nec satis varia et commoda inventa sunt supputationum compendiæ; præsertim *circa progressiones* quarum in physicis usus est non mediocris.—*De Aug. Scient.* lib. iii. cap. vi. *Bacon's Works*, Vol. vii. p. 204.

Bacon could not have written this with any knowledge of the nature and effect of Napier's inventions; and Napier could not have taken his hint from Bacon, because the baron was dead before the publication of the De Aug. Scient.

† Ergo in tam faciles numerorum tædia lusus
Versa, mathematicos qui latuêre prius.
Dum *Logarithmus* erit, dum *Virgula*, *Scacchia*, *Lamnæ*,
Magnum erit et nomen, magne Nepere, tuum.
Patricius Sandeus. 1617.

losophy to bear simply but systematically upon scientific theology, and by his writings to demonstrate, that the humble heart of a perfect Christian, and the profound head of a master in science, might be combined to illustrate the Scriptures. Napier, too, even for the most visionary portions of his work, finds an excuse in his times which cannot apply to modern writers. Whether the Pope be Antichrist was then a great political and constitutional question upon which revolutions were pending; and although he treated it not as a political partisan, but with the calm and sincere conviction of a pious Christian, still the cause of freedom with which it was immediately mixed up, and the patriotic interests it involved, entirely remove his treatise on the subject from the class of useless and fanciful speculations, which the subject is too apt to engender. In the present state of the world it creates no sensation to hear M. Biot announce, that it is impossible for him to believe the eleventh horn of Daniel to be the Church of Rome; but the times were very different when Napier wrote.* To this we must add, that when such

* See M. Biot's review of Brewster's Life of Newton.—*Journal des Savans*, 1833, p. 339. Sir David says, "The Newtonian interpretation of the prophecies, and especially that part which M. Biot characterizes as unhappily stamped with the spirit of prejudice, has been adopted by men of the soundest and most unprejudiced minds." But it is a mistake to talk of the *Newtonian* interpretation in this matter. Napier (pp. 46, 47, 48, 49, 50, 51, 352, 353, 354, &c.) has upwards of nine quarto pages of condensed proofs, to demonstrate "that the little horn in Daniel, chap. vii. doth signify the Roman Antichrist and not Antiochus properly as some suppose."—P. 352, edit. 1611. The interpretation ought to be referred to Napier, and not to Newton. If it be true, he is entitled to the merit,—if it be false, his fame can better afford the failure, when we compare the times and circumstances under which he wrote with those of Sir Isaac Newton. It was from the years in which he was a commissioner to the General Assembly of the Church that Napier took his *signs of the times*; and we must sympathize with him even in his visions, to which Biot himself would not apply the epithet *illiberal*. No one had as yet commented on the Apocalypse systematically and historically. He wrote in the *marvellous year*, when the Church of Scotland was threatened from abroad, and betrayed at home,—when his own father-in-law (one in the court of the king) was a leader in the Popish plot. The signs he quotes are all immediately connected with the struggle betwixt the two religions. "In the 88, 89, and 90 yeares of God (says he,) God hath, by the tempest of his winds, miraculously destroied the hudge and monstruous Antichristian flote, that came from Spaine against the professours of God in this poore iland: Againe, God hath stirred up one of the chiefe murtherers of the saints of God in Paris even the late King of France, to murther the Duke of Guize, and the Cardinall, his brother, speciall devisers of that cruell massacre. Then further, that mighty God hath stirred up a desperat Papisticall frier to change lives with that bloody king; so that by the sword, and mutuall blood-shed of Papists among themselves, the right of the crown of France is now fallen into the

Protestants as Calvin and Joseph Scaliger openly avowed their impressions, that the whole Revelation of St John was an inexplicable mystery, of which the very writer was a problem, it is greatly to the honour of Scotland, that from the bosom of so rude a country a commentary should have come, worthy of the first scholar of the age, and capable, as we shall show, of instructing even our own enlightened times.

When Napier commenced his labours, the modes of investigating and promulgating the Scriptures, though beginning to be animated with a more rational spirit, were yet very faulty. Every country that aspired to be free was now bursting the fetters of the Catholic faith; but there were very few men, even among the learned, capable of teaching theology. As the century, at the close of which he appeared as an author, advanced, the sacred science reaped the benefit of the restoration of letters, in the substitution of biblical criticism founded upon an examination of the sacred writings, in place of the ponderous tomes and barbarous terms of the *Positivi* and *Sententiarii*, the divines of a false and unintelligible philosophy. Yet prior to Napier's time not a single work can be pointed to, of the nature and extent of his, which like that is both profound and clear,—of varied erudition, yet simple in its doctrines, and systematic in the arrangement,—at once argumentative, succinct, and rational. Under these circumstances, the world was fortunate to obtain so beautiful an example of Scriptural investigation. He wrote amid a hurricane of contending religions. He produced a work most effective in its disclosure of Antichrist, but so replete with Christian charity, that its last sentence implores Antichrist to repent and be saved; containing matter for the reflection of sages; yet so clear and simple in its method, that a child might understand; not, indeed, entirely free from the fallacies and mysticism that must ever attend a minute commentary on the subject, but chargeable with neither the weakness nor wildness of our own enlightened century, and treated with precisely that " sapientia sobrietas et reverentia" which Lord Bacon inculcated.

One observation occurs forcibly upon a perusal of it, and that is, its vast superiority in point of *style*, not merely to his contemporaries, but to

hands of the King of Navar, who, pretending himselfe to have bene a Protestant, the church of true Protestants under him hath thereby had rest hitherto. And with these miraculous accidents hath this jubilee begun, hoping in God, before the end thereof, to heare that whole papistical city and kingdome of Rome utterly ruined: For these premises were as unlikely before those three yeares." —*Plain Discovery*, p. 228.

the popular and talented apocalyptic writers in Scotland of the present day. When the eye is relieved by the slight alteration which the antiquated orthography requires, we find ourselves led into his alarming subject by sentiments so rational, conveyed in sentences so distinct and unaffected, that our alarm begins to wear off soon after the title-page is passed. He commences in his introductory address by anticipating what in his time was the dictum of a tyrannical priesthood, and in ours is the pious proposition of the weak minded,—namely, that every application of human reason to investigate the Christian scheme is forbidden. "Although," says he, "the nature of the truth be of such force and efficacy, that after it is heard by the spiritual man, it is immediately believed, credited, and embraced; yet the natural man is so infirm and weak, that his belief must be supplied by natural reasons and evident arguments. Wherefore many learned and godly men of the primitive church have gathered out divers pithy and forcible, natural and philosophical arguments to prove and confirm the Christian faith thereby. As in the 1st Corin. xv. 36, Paul, the learned and godly teacher of the Gentiles, persuading them to confess the resurrection of the dead, induceth a marvellous pithy and familiar argument, by a natural comparison of seed sown in the ground, that first must die and be corrupt in the earth, and then doth it quicken up and rise again after another form than it was sown into. And likewise, other learned doctors of the primitive church, writing to the Ethnicks, (who stirred at the Virgin's conception, and at Christ's divinity,) reasoneth with them on this manner, saying, 'your Gods, as ye believe,' have conversed with many women among you, and have begotten many children who have wrought no miracles; and how can ye, that so believe, deny us that our great God hath begotten one Son, in whom divinity and humanity are conjoined; seeing your eyes and forefathers have seen so many and divine miracles wrought by him and in his name. And so most wisely used they these Gentiles' own opinions and arguments against themselves; which moved the malicious apostate Julian the Emperor to discharge from Christians the schools and learning of philosophy, yielding the reason, because saith he, *propriis pennis perimur*."

This is the preamble of one who saw far before him, and deeply into his subject; and the quiet, rational, historical tone of this fine old Scottish baron will be best appreciated by glancing for a moment to the most popular work on the same subject of the present day. Keith thus commences his *Signs of*

the Times:* "Never, perhaps, in the history of man, were the times more ominous, or pregnant with greater events than the present. The signs of them are in many respects before the eyes of men, and need not to be told." "It is not a single cloud surcharged with electricity, on the rending of which a momentary flash might appear, and the thunderbolt shiver a pine, and scathe a few lowly shrubs that is now rising into view; but the whole atmosphere is lowering, a *gathering* storm is *accumulating* fearfully in every region,—the lightning is already seen gleaming," &c. &c. "A citizen king, the choice of the people, and not a military usurper, sits on the throne of the Capets; and, as if the signal had gone throughout the world quick as lightning," &c. "from the banks of the Don to the Tagus," &c. "from the new states of South America to the hitherto unchangeable China, skirting Africa and traversing Asia, to the extremity of the globe on the frozen North, there are signs of change in every country under Heaven," &c. But no sooner is his first storm past, than the same author utters a sentiment highly complimentary to the more old fashioned style of our philosopher. "It is not by a light issuing from the earth, nor by the meteor gleam of high imaginations, that a page of future history can be read, or the dark recesses of futurity be disclosed."

This characteristic difference betwixt Napier and the moderns of the nineteenth century prevails throughout the whole of their respective expositions. †

* "Signs of the Times," &c. by the Rev. Alex. Keith, &c. 2d edit. Edinburgh, 1832. See Introduction, &c.

† See also "A Dissertation on the Seals and Trumpets of the Apocalypse, and the prophetical period of 1260 years, by William Cunninghame, Esq. of Lainshaw, in the county of Ayr, 3d edit. Corrected and Enlarged."—"The result," says the author, "of thirty years' meditations on this wonderful book." But *cui bono?* To have excused the work it ought to have been more *learned*, more *practical*, more *scriptural*, more *clear*, and more *original* than Napier's; and these are precisely the advantages possessed by the old philosopher over the modern enthusiast. Yet it would appear, that in his thirty years' meditation he had never read Napier. He says, "to those who are conversant with the writings of the older commentators on the Apocalypse, it will be evident that I have carefully consulted their works," &c. p. 28. He lays great stress upon the proposition, that "the whole series of the *first six seals* relates to the *church*, with the exception of the *political earthquake of the sixth*," p. 26, and not that the first applies to the *church* and the rest to the *empire;* and he adds, "Archdeacon Woodhouse, in his learned work on the Apocalypse, seems to be *the first writer* who has adopted" the view in the above proposition; "till I saw his work I rested in the commonly received interpretation of the above seals." Now, one of Napier's divisions of the Apocalypse is into *secular* and *ecclesiastical* history. To *the seals* he refers the history of the *church*,—1st Seal,

A man of sound and sober judgment may read the Plain Discovery, and, without being satisfied of the accuracy of all its interpretations, close the volume a wiser and a better man than when he opened it. In the perusal his mind is suffered to repose upon the sacred volume itself; and, without being either warpt or irritated by the fancies of the ancient commentator, he may gather many a bright light and consolatory reflection from the practical wisdom and pure Christianity of which the staple of his work consists.

With all his simplicity, Napier is singularly close and critical in his commentary. For instance, Bishop Newton, in commenting upon the first chapter of the Apocalypse, says, " In the first vision Jesus Christ, or *his angel, speaking in his name and acting in his person*, appears," &c. Napier sifts this material point. " Some," says he, " may think this not to be Christ, but an angel bearing the type and figure of Christ, whom Christ had deputed;" and then, that the glory of God may not be given to angels, he enters into a close and beautiful argument to prove that *quasi filius hominis*, and *similis filio hominis*, are meant not of a representation of Christ by another, but of Christ actually in the Godhead, though made visible to the prophet in the *similitude* of his flesh; " not in his humanity, as the Son of Man, but in the likeness of the Son of Man."† He then anticipates and exposes a sophism in the following characteristic manner: " Here may some induce a sophism, saying, He who was dead and revived eternally, appeared to *John*. But Christ in his humanity died, and revived again eternally: therefore, Christ in his humanity appeared unto *John*.

Christ opens and preaches the Gospel,—*St Matthew*. 2d Seal, Persecution of the church,—*St Mark*. 3d Seal, Increase of the Gospel,—*St Luke*. 4th Seal, Heresies in the church,—*St John*. 5th Seal, Martyrs in the church under Nero. 6th Seal, partly *ecclesiastical* and partly *secular*; being the persecution of the church, and the *revolting of the nations*. So much for Archdeacon Woodhouse's originality. Again; " Interpreters," says Mr Cunninghame, " have generally supposed that the rider on the white horse is our Lord himself." He dissents and again quotes Archdeacon Woodhouse, who says, " the progress of the white horse seems to be rather that of the Christian religion," &c. But Napier explained all this centuries prior to Cunninghame or the Deacon before him. He interprets it, " the pure and holy teachers and apostles," p. 140.

Keith takes his signs from " *Annual Register*,"—" *Capt. Alexander's Travels*,"—" *Spain, by H. D. Inglis*,"—" *Sir Walter Scott's Napoleon*,"—*Edinburgh Almanack*,"—" *Victims of Don Miguel's cruelty*, COURIER, July 13, 1831." But this author lost a sign; for Count Cape St Vincent had not then taken Don Miguel's fleet. In Cunninghame, Napier appears as if *caricatured*; in Keith, as if *travestied*.

† P. 103.

For opening the deceit of this caption, the *subject* of the assumption is Christ alone: His *attributum* is to die in His humanity, and to revive again eternally; and therefore neither this His humanity, nor any part of this *attributum*, ought to be repeated in the conclusion, but only the *subjectum* Christ, with the *attributum propositionis* after this form: He who was dead and liveth eternally appeared unto *John;* but Christ died in His humanity, and revived again eternally: therefore Christ appeared unto *John*. And to the effect that the vulgar capacities may understand these frauds, this is, as one would say in a familiar example, he who carried this book to you wrote the same; but on horseback I carried this book to you, therefore on horseback I wrote this book. Whereas the right argument should be this wise disposed: he who carried this book to you wrote the same; but I carried this book to you on horseback; or rather, simply, but I carried this book to you; therefore I wrote this book. Praying, therefore, the simple to beware of these and the like sophisms, I thought good in this due place, to yield this one by way of example." *

Both Napier and Kepler took their illustration of the Trinity from science. The former notices "the marvellous harmony and accord in all points betwixt God and His holy Jerusalem." "God is one; so here by one only spiritual Jerusalem He representeth His church. There be three equal persons of the Deity; Father, Son, and Holy Ghost. So be there here of this Jerusalem three equal dimensions of longitude, latitude, and altitude. None of the three persons of the Deity is separable from other; so none of these three dimensions of a city, or of any solid body, can be separable one from another, for then should it become a superfice and no solid body. The three persons of the Deity and their functions cannot be confounded; so are not these three dimensions confounded, for the length is not the breadth, nor the breadth the height." † Kepler, in his *Harmonices Mundi*, took the spherical world as an image of the Trinity. He supposed the Father the centre, the Son the surface, and the Holy Ghost all that is betwixt the centre and the surface; and thus inseparable without being confounded. Kepler's Christianity, however, was mixed up with the wildest flights of an exuberant imagination. Napier's presents that chastened sobriety throughout, which renders many of his notes and illustrations plain and practical discourses. How refreshing is it to turn from some noisy tirade in our own times against good works, to a reconcilement of the doctrines so

* P. 106. † P. 313.

simple and satisfactory as this: "By works here are we judged and justified, and not by faith only; as also James ii. 24, testifieth; meaning thereby, that of lively faith, and of the good works that follow thereupon, man is justified; and not of that dead faith that is by itself alone without any good works; otherwise were the words of Paul (Rom. 3. 28,) expressly contrary to this text and to James; for saith Paul, 'we are justified by faith without the works of the law; that is to say, not without good works whatsoever; but meaning that we are justified by lively faith, with such small good works as our weak nature will suffer that faith to produce, although it be without the precise works that the law requireth. And for confirmation of this interpretation, and union of these texts, ye shall find both James and Paul agree in divers places that faith without works is a dead faith, and serveth nothing to justification. And again they agree both, that all works, how good soever they seem, that proceed not from faith are evil. And so it is no difference to say with Saint Paul, we are justified by fruitful faith, or faith that produceth good works, although not the works that the law requireth; or to say with James, and here with Saint John, we are justified by faithful works; seeing a working faith and faithful works are inseparable, and none can have the one without the other. So for conclusion, these works by the which here we are judged, are to be esteemed good or evil, not in themselves or in so far as they satisfy the law, (for so were all works evil and imperfect,) but in so far as they have or want faith adjoined with them, they are accounted good or evil only."*

As some of our modern theologians might cull from him a correction of their mysticism, so might others of their credulity. A popular historian of the Church of Christ solemnly records, as a Christian miracle, the fable that "Constantine marching from France into Italy against Maxentius, on an expedition which was likely either to exalt or ruin him, was oppressed with anxiety. Some god he thought needful to protect him. The God of the Christians he was most inclined to respect."—"He prayed, he implored, with much vehemence and importunity, and God left him not unanswered. While he was marching with his forces in the afternoon, the trophy of the cross appeared very luminous in the heavens, higher than the sun, with this inscription, 'Conquer by this.' He and his soldiers were astonished at the sight. But he continued pondering on the event till night. And Christ appeared to him when asleep, with the same sign of the cross, and directed him to make use of the symbol as his military

* P. 296.

ensign." * But Napier, with much better reason, takes this as about the commencement of the abused mark of the cross, " which," says he, " was now induced among the Christians by the fabulous alleagance of two feigned miracles; the one, that Queen Helen the mother of Constantine, admonished by an heavenly vision, passed, and did find that very real cross whereon our Lord suffered; the other, that Constantine her son, fighting against Maxentius, saw appear in the air the figure of a cross, with these words, *in hoc signo vinces*, by this mark thou shalt overcome, with which mark and inscription the Portugal ducat and some other coins of late are imprinted." †

He interprets the text (Rev. xx. 6,) regarding the reign of Christ for a thousand years, to mean eternity, and thus treats the millenary doctrine: " By this text, literally and definitely taken, resulted the great error of *Cerinthus*, and his sects of *Chiliasts* or *Millenaries*, who thought our reign with Christ to be on earth, and temporal, for a thousand years, and we then again to die and ly dead another thousand years, and so about by vicissitudes, as did of old the *Platonicks*, and of new in a manner the *Originists*. Further, some also, by the mistaking of this text, suspected the authority of this whole Revelation; but to the true Christian conceiver thereof, both is the authority of this book confirmed, and the heresy of the millenaries refelled."

The following may be taken as an example of his philological learning, of which there are many indications: " The vulgar text saith here, (Rev. x. 7,) quum cæperit tubæ canere consummabitur mysterium magnum; that is, ' When he begins to blow the trumpet;' but the original Greek may rather import, ' After he shall blow the trumpet;' for the word ὅταν may more justly be taken for *after* than for *immediately* or *incontinently when*, &c. as is to be seen in Mark iv. 32, where ὅταν is taken for a long time after, and not instantly; for there it is not meaned that the seed which is sown doth instantly rise up; and John viii. 28, by the word ὅταν meaned not that instantly after the crucifying of Christ they should know him truly, but rather after a certain progress of time from his passion. We therefore here justly dissent from the vulgar translation," &c. And thus he scatters classical allusions and quotations throughout his commentaries. " This θυινον is the word *Thyia*, which Theophrastus reporteth to be a long-lasting and incorruptible timber; thereof mentioneth Pliny, Lib. xiii. c. xvi.; and with this timber tem-

* Milner's History of the Church of Christ, Vol. ii. p. 41. Edit. 1827.

† Napier says, " Constantine was illuded by a cross shadow in the clouds."—pp. 75, 89.

ples in old times were decored and replenished." Again, "Aretas reporteth that the ancients were accustomed to give a certain white stone to him that did get the victory in their plays and games. Moreover, among the ancients they that cleansed or absolved an accused person did cast in a white stone, and they that filed or convicted him did cast in a black stone, as Ovid testifieth, Lib. xv. Metamorph. in these words,

> "Mos erat antiquis, niveis atrisque lapillis,
> His damnare reos, 'illis absolvere culpa.'"

Nor must we omit a notice that may interest the antiquaries. When illustrating the names of blasphemy upon the seven heads of the beast, our philosopher refers to the superscriptions and titles dedicatory of the Roman monuments; "as," says he, "Diis manibus, Fortuna, Plutoni, Veneri, Priapo; and even at Musselburgh, among ourselves in Scotland, a foundation of a Roman monument lately found, now utterly demolished, bearing this inscription dedicatory, *Apollini Granno Quintus Lucius Sabinianus Proconsul, Aug.*"

Sometimes he illustrates a proposition as Lord Stair might have done. "Our lawyers, in the account of the six days that go betwixt every citation and summons of the letters of four forms, neither account the first day of the summons, neither the next day, nor any day upon which they do summons; but, leaving out the extremes, they reckon only the six middle whole days, upon which no citation or summons falleth. As, for example, if the first summons be execute upon Tuesday, it is not lawful to execute the next summons before the next Tuesday, and this they call a summons of six days." (We wish that my Lord Stair had always been as distinct.) At other times, as if, like Kepler, he could have written a treatise on music. "Among the musicians, the eighth voice, or octave above *de-sol-re*, is called *de-la-sol-re*, and the octave above *de-la-sol-re* is called *de-la-sol*; yet, from *de-sol-re* to *de-la-sol*, there are not twice eight, or sixteen voices or harmonical notes, but fourteen alanerlie; and yet is that space called two *octaves*."

These are but a few, and, perhaps, not the best selected examples of the practical nature of his theological works, upon a subject, and in times, which afforded every temptation to run into barbarous mysticism and controversial jargon. Such is the manner which our philosopher adopted to instruct the uninformed of his own country; the *sobrietas et sapientia* with which he handled the dangerous subject of prophecy.

At the end of his treatise are added, "certaine oracles of Sibylla," the authenticity of which Napier doubted, but inserted in this place rather than omit them entirely, as they were ancient, generally believed, and coincided with the Scriptural prophecies. They are chiefly to be noticed, however, as affording a good specimen of his powers of versification, and the extent to which he carried his flirtation with the muses. He mentions that he gives these oracles from Castalio's Latin translation, "faithfully Englished this way." Of these we may select a few specimens.

O cursed and unhappy Italy,
Unmeind or mourned for, barren shalt thou be.
To ground as green as wilderness unwrought,
To woodes wild, and bushes beis thou brought.

Far shalt thou flit into an uncouth land,
Thy riches shall be reft out of thine hand.
In thy wall-steds shall wolves and tods convene.
Waste shalt thou be, as thou hadst never been.
Where then shall be thy oracles divine?
What golden Gods shall keep or save thee syne?
What God, I say, of copper or of stone.
Where then shall be the consultation
Of thy senate? What helps thy noble race
Of Saturn, Jove or Rhea, in this case,
Whose senseless souls and idols thou before
Religiously didst worship and adore.
The fathers old, and babes shall mourn for thee,
Beholding then thy dolorous destiny.
On Tiber banks lamenting sore thy case,
Sad shall they sit with many loud alace.
Lament shall you, and mourn, laying aside
Thy purple weed, imperial robes of pride,
And into sackcloth sitting sorrowful,
Repeat shalt thou thy plaintis pitiful.
O royal Rome, thou bragging prince but peer,
Of Latin land the only daughter dear;
Thy pride, but pomp, ruined shall remain,
Thou, once trode down, shall never rise again;
For gone shall be the glore of that armie,
That bears the eagles in their enseignie.

Then ends the world, then comes the latter light,

Then God shall come to judge his folk aright.
But first shall fall on Rome, but resistance,
Of God, his wrath, the wofull vengeance.
A wofull life, a bloudie time shall be.
Oh! people rude, oh land of crueltie,
Thou little lookest, nor doth regard aright,
How poor and bare thou first came in the light,
That to the like again you should return,
And last, before a dreadful judge should murne.

We have known an Oxford prize-poem worse than this.

There is one view arising from the whole of this chapter of our philosopher's history which must not be omitted. Those who are incapable of appreciating the power and originality of mind necessary to have invented the Logarithms, but who, at the same time, can just understand that Napier did something for science, are apt to regard him in the same light that the historian Pinkerton did,—" only an useful abbreviator of a particular branch of the mathematics." In this view of his capacities, he would rank with that inferior class of scientific men, who possess power sufficient to act upon principles already discovered, but have not within themselves the intellectual resources for establishing original principles. How mistaken this view of Napier's genius is, will be best seen when we come to the history of his *mathematical* life. But it is not unimportant to observe, and it will stand as an excuse for our having dwelt so long upon the subject, that from the review of his *theological* character we may arrive at the same conclusion, that, as a man of science, he must have belonged to the very highest class, the class of Newton, and could not have been a mere mathematician. In a recent philosophical production, the question has been admirably considered, how far the study of mathematics is unfavourable to religious views; or, to put the proposition more fully in the words of the author, how far " deductive habits, or the impression produced on men's minds by tracing the consequences of ascertained laws," are unfavourable to " a belief in a Divine Author of the universe, by whom its laws were ordained and established." * Now, the value of this writer's solution of the question, is the establishing a distinction betwixt those capable of *original discovery*, and those

* Astronomy and General Physics considered with reference to Natural Theology, by the Rev. William Whewell, M. A. Fellow and Tutor of Trinity College, Cambridge. London, 1833.—P. 302, *et infra.*

only occupied with *derivative speculations*. If there be, says his argument, a tendency in men of science to refer every thing to mechanical causes, and to exclude from their view all reference to an intelligent First Cause and governor, it is not owing to "the mathematical habits of the mind, but the deficiency of the habit of apprehending truth of other kinds,—not a clear insight into the mathematical consequences of principles, but a want of a clear view of the nature and foundation of principles,—not the talent for generalizing geometrical or mechanical relations, but the tendency to erect such relations into ultimate truths and efficient causes."

How well does this illustrate the intellectual *calibre* of the man who wrote the Plain Discovery, and invented the Logarithms; and how bright an example does Napier afford, that a falling off from religion must argue a *defective* rather than a *perfect* scientific constitution? How well does this prove that it would be great neglect in his biographer not to bring prominently into view the whole history of his theological studies? For it is the *combined* view of the two great characteristics of his mind, its RELIGION and its SCIENCE, that will best prove him to have been, not "the mathematical philosopher dwelling in his own bright and pleasant land of deductive reasoning, till he turns with disgust from all the speculations in which his practical faculties, his moral sense, his capacity of religious hope and belief, are to be called into action;"—but one of "those mathematicians whose minds have been less partially exercised,—the great discoverers of the truths which others apply,—the philosophers who have looked upwards as well as downwards,—to the unknown as well as to the known,—to ulterior as well as proximate principles,—and who have perpetually looked forward beyond mere material laws and causes, to a First Cause of the moral and material world." *

* Astronomy and General Physics considered with reference to Natural Theology, by the Rev. William Whewell, M. A. Fellow and Tutor of Trinity College, Cambridge, pp. 337, 339, 340.

CHAPTER VI.

HAVING bestowed a chapter upon our philosopher's theological works, and thereby, it is hoped, at least afforded the means of forming a juster estimate of his character in that respect; we would have wished to relieve the dulness of our imperfect review, by introducing the reader more particularly to Napier himself,—by making him as well acquainted with the Baron of Merchiston as he is with the Baron of Bradwardine,—and inducing him to spend, like Henry Briggs, * one whole month with him in his war and weather-beaten tower. We are certain that a month of real life at Merchiston, enjoyed through the safe medium of a minute and graphic account, would satisfy the keenest appetite for romance, without offending the lovers of truth and history. From what can be discovered, it is obvious that all the ingredients essential to the most fascinating historical novel actually occurred in the career of the Inventor of Logarithms. Independently of his sound and practical views of the Christian scheme, and of his substantial triumphs in mathematics, he moved amid a halo of the romance of religion, the romance of science, and the romance of history. He persuaded others no less than himself, that he had ascertained about the period of the end of all things earthly; and he stood among the Protestants of Europe as the being who, by the intensity of his faith, and the depth of his speculations, had been enabled to read the world its destiny, and from encountering whom the boldest of the Catholic champions shrunk back. He had gazed, too, upon the stars with more than mortal aspirations; and while he was silently determining, that, through his means, their eternal paths should be subjected to a more certain and rigorous

* "Ubi humanissime ab eo acceptus, *hæsi per integrum mensem*," says Briggs of his visit to Merchiston.

scrutiny, he had caught a corner, at least, of the mantle of *Cardan*, and loved to trifle with those mysterious indices of futurity. All this, in addition to the romantic historical relations already traced, would give us something beyond "the cold, dry, hard outlines which history delineates;"* and did we but possess good store of the connecting links of daily incident and domestic intercourse, there would be in this instance little need "to fill up and round the sketch with the colouring of a warm and vivid imagination, which gives light and life to the actors and speakers in the drama of past ages."† Without the pen of Scott, but with some of those every-day facts which must have connected the prominent features of our philosopher's life, one month in Merchiston, at any time from the epoch of the Douglas wars to the commencement of the seventeenth century, would be fairly worth two,—even at Tully-Veolan.

There is this remarkable circumstance in his history, that while he possessed the respect and confidence of the most able and Christian pastors of the Reformed Church, and while he was looked up to and consulted by the General Assembly, of which he was for years a member, he was at the same time regarded, and not merely by the vulgar, as one who possessed certain powers of darkness, the very character of which was in those days dangerous to the possessor. Traditions to this effect might be met with in the cottages and nurseries in and about the metropolis of Scotland not many years ago; and the marvels attributed to our philosopher, with the aid of a jet-black cock supposed to be a familiar spirit bound to him in that shape, have, within the memory of the present generation, been narrated by the old, and listened to by the young. We cannot help suspecting that the legend of the black cock is in some way connected with the hereditary office of king's poulterer (*Pultriæ Regis*,) for many generations in the family of Merchiston, and which descended to John Napier. This office is repeatedly mentioned in the family charters as appertaining to the "*pultre landis*," hard by the village of Dene, in the shire of Linlithgow. The duties were to be performed by the possessor or his deputies; and the king was entitled to demand the yearly homage of a present of poultry from the feudal holder. It is not improbable that our philosopher made a pet of some jetty chanticleer, which he cherished as the badge of his office, and as worthy of being presented to the king, *si petatur*.‡ If so,

* Waverley. † Ibid.

‡ The Society for the Diffusion of Useful Knowledge has Mephostophilized our philosopher. "It was believed, it seems, that he was attended by a familiar spirit in the shape of *a large black dog*."—*Pursuit of Knowledge under Difficulties*. His contemporary Tycho was constantly attended by "son chien, qu'il aimoit beaucoup, qu'il avoit meme pris pour son symbole, et qu'il avoit

there can be little doubt that in those days it would pass for a spirit. A story was once abroad of this animal, which has since reappeared in some popular drama or nursery tale. It is said that Napier adopted the policy of Mahomet to control his own domestics, and impressed them with a belief that he and chanticleer together could detect them in their most secret doings. Having missed some property, and suspecting his servants, he ordered them one by one into a dark room, where his favourite was confined, and declared that the cock would crow when the guilty one stroked his back, as each was required to do. The cock remained silent during all the ceremony; but the hands of one of the servants were found to be entirely free from the soot with which the feathers of the mysterious bird had been anointed. The story of his bewitching the pigeons is yet remembered about the neighbourhood of Merchiston. He had been annoyed by the flocks that ate up his grain, and threatened to *poind* them. "Do so, if you can catch them," said probably his "nichbour, the Lard of Roslin;" and next morning the fields about Merchiston were alive with reeling pigeons, who were easily made captives, from the intoxicating effect of a dose of saturated pease.* There are other traditions of the Laird of Merchiston which savour more of supernatural means; but lest the reader suspect us of taking liberties with his credulity, we shall content ourselves with referring to similar reminiscences, met with about the place of Gartness, part of the Napier property in the Menteith, in the words of the clergyman who collected them for the Statistical Account of Scotland.

"Adjoining the mill of Gartness are the remains of an old house in which John Napier of Merchiston, Inventor of Logarithms, resided a great part of his time, (for some years,) when he was making his calculations. It is reported that the noise of the cascade being constant, never gave him uneasiness; but that the clack of the mill, which was only occasional, greatly disturbed his thoughts. He was therefore, when in deep study, sometimes under the necessity of desiring the miller to stop the mill, that the train of his ideas might not be interrupted. He used frequently to walk out in his night-gown and cap. This, with some things which to the vulgar appeared rather odd, fixed on him the character of a warlock. It was firmly believed, and currently reported, that he was in *compact with the Devil;* and that the time he spent in

fait représenter dans une Médaille, ou étoient gravés ces mots, *Tychonis Brahei delitium.*"—*Histoire des Philosophes Modernes*, T. v. p. 59, 1766. Upon the seal of a letter written by one of Napier's brothers, I find the symbol of a cock.

* A field in front of Merchiston is pointed out as the scene of this exploit, and still called "the Doo Park."

study was spent in learning the black art, and holding conversations with Old Nick." * From this worthy clergyman's narrative, we might be led to suppose, that our philosopher cooled himself of an evening by walking abroad in his *night-gown* and *night-cap*; a freak more decent to be sure, yet even more ridiculous than the ecstacy of Archimedes, who rushed naked from the bath through the streets of Syracuse. But if the reader will turn to the etching which illustrates our Preface, he will there see the sober cowl and gown in which, we doubt not, our philosopher frequently appeared; and he will exonerate him from the charge of a more eccentric costume. He himself remarks, in his notes upon the first chapter of the Apocalypse, "long garments or gownes were of olde, and to this day, worne of doctors and senatours, to represent gravitie and wisedome."

If, as the Reverend Mr Ure reports, John Napier really enjoyed in his own times the character of "holding conversations with Old Nick," it is a most remarkable fact in his history, that never for a moment did he fall into the slightest "*cummer*" on that account. The period of the Popish conspiracy, to which we have brought down his memoirs, was particularly fertile in persecutions for sorcery and witchcraft; and, when the cry was once raised against an individual, neither rank nor innocence were sufficient to afford protection. The name of Napier, too, had about this time come under that fatal imputation. David Moysie the notary (who was well acquainted with the Merchiston family during the life of the philosopher) records, that, in the year 1590, "Barbara Neapper, and Euphane M'Kallian, [a daughter of the Lord of Session of that name,] wemen of guid reputation afoir, wer teane as witches, † with sundrie utheris, baithe men and weemen. Sampsoun wes brunt, and died weill; the rest wes keepit. Amangis the rest, ane Ritchie Grahame, accusit of witchcraft, confest many poyntis, and declaired that the Erle of Bothuell wes ane treffecker with him and utheris, anent the conspyring of the kingis dead. Quhairupone the Erle of Bothuell being send for and accusit, being ane great poynt of treasoune, wes committed to waird within the Castle of Edinburgh, and verie straitlie keepit." This accusation and harsh treatment drove Bothwell to the roving life of turbulence and treason, which for several years kept King James in constant and almost ludicrous terror; until the Earl, who long contrived to make his hand save his head, was at last

* Account of the Parish of Killearn, Stirlingshire, by the Rev. Mr David Ure, M. A., Minister, Glasgow. *Statistical Account*, Vol. XVI. p. 104.

† See Mr Pitcairn's Collection, for their trial and whole history.

driven into exile. I cannot discover the slightest connection betwixt Barbara Napier and the family of Merchiston; but it is singular that John Napier may be traced into one very curious instance of dangerous proximity to this Earl of Bothwell, to whom the imputation of sorcery clung, like the mark of Cain, wherever he went.

A very pleasant exercise of such powers was the discovery of hidden treasure, which, from the lawless and unsettled state of the country, (so strongly commented upon by Napier in his letter to the king,) was not unfrequently secreted by those who never returned to recover it. At the crisis of the battle of Glenlivet, when the Popish earls defeated Argyle, the public mind was deeply imbued with the imagination of effecting such precious discoveries by supernatural means. It appears that Argyle had along with him in the field of battle a noted sorceress, for the express purpose of bringing to light, by her incantations, the treasures hid under ground by the terrified inhabitants.* This was one of the arts for which Bothwell was famed; a reputation he attempted to turn to profitable account in his exile. The traveller and poet, George Sandys, mentions, that when he was abroad in the year 1610, "a certain Calabrian, hearing that I was an Englishman, came to me, and would needs persuade me that I had insight in magick, for that Earl Bothwell was my countryman, who lives at Naples, and is in those parts famous for suspected necromancy;" and Sir Charles Cornwallis, in a letter to the Lords of the Privy-Council, dated from Valladolid 1605, after mentioning some of the banished nobleman's scandalous freaks on the continent, adds, "this moves the rest of his carriages to be looked into; and, by takeing upon him to tell fortunes and help men to goods purloyned, he hath incurred the suspicion of a sorcerer." † Now it must be observed, that before the earl was driven out of Scotland, one of his sworn friends and most useful allies was that turbulent and irregular baron, Robert Logan of Restalrig. He was the head of an ancient and powerful family, long in possession of what amounted to a principality of property about the town of Leith, but which was greatly dissipated in the hands of this unprincipled representative. Robert Logan, however, had made

* There is preserved in the Advocates' Library a Latin manuscript, being a contemporary circumstantial account of the battle of Glenlivet or Belrinnes, where this fact is particularly mentioned, "*Adde et illud quod insignem veneficam itineris comitem habuerint, eo consilio ut suppellectilem ab incolis metu reconditam, et thesauros abstrusos, incantationibus proderat,*" &c.

† Winwood's Memorials of State Affairs.

one acquisition of no small value to a person of his propensities and habits, and that was the fortress of Fastcastle, being one of the most impregnable places in the kingdom. Overhanging a sheer precipice of vast height washed by the German Ocean, it required very little skill in those times to render such a stronghold as secure from mortal invasion as the depths of the ocean.* Logan did not constantly inhabit this wild and dreary fastness, but reserved it for desperate emergencies, living occasionally in a more Christian-looking dwelling-place in the vicinity. According to a mass of evidence collected on the subject, it was by this baron, in conjunction with the Earl of Gowrie, that the fearful conspiracy was hatched to carry off King James and seclude him from human aid and converse in the dungeons of Fastcastle. Here it was that Francis Earl of Bothwell was always sure of a safe retreat when hard pressed by the king's troops or the officers of justice; and here, too, his necromantic propensities must have met with the fullest encouragement, for no man was more constantly haunted with the hopes of recovering buried treasure than his host Robert Logan of Restalrig. The first scene in the Gowrie conspiracy opens with a reference to this natural craving for gold, satisfied by supernatural or sinister means. "The fyft day of August 1600, Mr Alexander Ruthven, brother to the Erle of Gowrie, come tymuslie to Falkland, quho did informe the kingis majestie that *certane gold wes fund within the grund*, in a plaice with the quhilk he wald on no wayis meddle unto sick tyme as his majestie did sie it, quairupon his majestie come to Perth to dyne with the said Erle,"† &c. and the organization of this hellish plot is traced to Logan under his own hand. As we must immediately disclose our philosopher in most extraordinary juxtaposition with this desperado, we shall premise an extract from Logan's original letters, preserved in the Register House, which place his character and habits under the most penetrating light. In one letter to the Earl of Gowrie, dated in July 1600, after impressing him with the necessity of profound secrecy, he adds, "and than I dout nocht, bot with God's grace we sall bring our matter till ane fine, quhilk sall bring contentment to us all that ever wissed for the revenge of the

* "The fortress called Fastcastle overhangs the German Ocean, occupying almost the whole projecting cliff on which it stands; connected with the land by a very narrow path, and of such security that, manned with a score of desperate men, it must in those days have been impregnable, save by famine."—*Sir Walter Scott's Hist. of Scotland.*

† Moysie's Memoirs.

maschevalent massakering of our deirest frendis. I doubt nocht bot M. A. your Lordschipis brother hes informed your Lordschip quhat course I layid down to bring all your Lordschipis associatis to my house of Fastcastell be sey, quhair I suld hew all materiallis in reddyness for thair saif recayving a land, and into my house; making, as it wer, bot a maner of passing time, in ane bote on the sey in this fair somer tyde; and nane other strangeris to hant my house, quhill we had concluded in the laying of our platt, quhilk is alredy devysed by M. A. and me. And I wald wiss that your Lordschip wald ather come, or send M. A. to me, and thereftir I sould meit your Lordschip in Leith, or quyetly in Restalrig, quhair we sould hev prepared *ane fyne hattit kit,* with succar, comfeitis and wyn;* and thereftir confer on matteris. And the soner we broght our purpose to pass it wer the better; before harvest. Let nocht M. W. R. your auld pedagog ken of your comming, bot rather wald I, if I durst be sa bald, to intreet your Lordschip anis to come and se my awin house, quhair I hev keipit my Lord Bothwell in his gretest extremities, say the king and his counsall quhat they wald. And incaise God grant us ane happy success in this erand, I hope bayth to haif your Lordschip, and his Lordschip, with money otheris of your loveris and his, at ane gud dyner before I dy. Alwyse I hope that the K (ingis) buk-hunting at Falkland this yeir sall prepair sum daynty cheir for us, againis that denner the nixt yeir. *Hoc jocose*, till animat your Lordschip at this tyme, bot efterwartis we sall hev bettir occasion to mak mery," &c. In the same letter he mentions the bearer of it, " my man Laird Bour—and I trow he wald nocht spair to ryde to Hellis-yet † to pleasour me." After committing his Lordship " to the protectioun of the Almychtie God," Logan concludes, by subscribing himself, " Your awin sworne and bund man to obey and serve with efauld and ever redy service, to his uttir power till his lyfis end,

" RESTALRIGE." ‡

* A preparation of milk; also called *Corstorphine cream.*

† The gates of Hell.

‡ Restalrig's original letters, and other proceedings in reference to the detection of the Gowrie conspiracy, have been only recently discovered among the warrants of Parliament preserved in the General Register-House, Edinburgh. They are printed and illustrated in Mr Pitcairn's Collection of Criminal Trials, where the curious reader will find the character of Restalrig more fully displayed. It may be remarked, that his letters conclude with committing his correspondents in this nefarious matter " to the protectioun of the Almychtie God," or " to Chrystis haly protectioun," and yet he

About the commencement of the year 1594, the very time when he was sheltering the Earl of Bothwell in his stronghold in defiance of king and council, and a few months after the date of John Napier's letter to his majesty in reference to the Spanish plot, Restalrig, in great need no doubt of the sinews of war and wickedness, adopted two modes of acquiring wealth. He seems to have sent his servants to the king's highway, with instructions to knock down and rob, and, if necessary, to murder the richest man they could meet; and he, at the same time, determined to apply even to higher authority than his guest the Earl of Bothwell, or, in legal phrase, to retain the best counsel in Scotland, upon the necromantic question of treasure buried at Fastcastle. In the books of the High Court of Justiciary, it stands recorded, that, upon the 13th June 1594, Robert Logan of Restalrig is ordained to be denounced rebel, for not appearing before the king and council, to answer a charge at the instance of Robert Gray, burgess of Edinburgh; "makand mention, that, quairupoun the *secund day of Aprile last*, he being passing in peceable and quiet maner to Berwick, for doing of certane his lessum effearis and busynes, lippynning for na trouble nor injurie of ony personis, treuth it is, that Johnne, alias Jokkie Houldie, and Petir Craik, houshald servandis to Robert Logane of Restalrig, with three utheris, thair compliceis, umbesett his hie way and passage, besyde the Bowrod; quha not onlie reft and spuilzeit fra him nyne hundredth and fiftie pundis money, quhilk he had upoun him, bot alsua, maist cruellie and barbarouslie invadit and persewit him of his lyffe, hurte and woundit him in the heid, and straik him with divers utheris bauch straikis upoun his body, to the grite danger and perill of his lyffe, to the said complenaris utter wrak," &c. Logan failed to appear and present these robbers for whom he was responsible; and was outlawed accordingly. How he was engaged *immediately* after this sentence had passed against him, will be seen from the following contract, which I find among the Merchiston papers:—

"Contract Merchiston and Restalrik.

"At Edinbruch the day of Julij, yeir of God i^{m} v^{c} foirscoir fourtein yeiris [1594.]—It is apointit, contractit, and agreit, betwix the personis ondirwrettin; that is to say, Robert Logane of Restalrige on the ane pairt, and Jhone Neper, fear of Merchistoun, on the uther pairt, in maner, forme, and effect as

gives as a reason for excluding Gowrie's "auld pedagog," Mr William Rhind, from the plot, that he "will dissuade us fra our purpose with ressounes of religion quhilk I can never abyd."

Contract Middleton & Maxwell.

At Edinburgh the day of July Zear of God myd fourteen fourtie
Zeirs It is apointit contractit & agreit betwix ye persons underwrittin y
is to say Robert Logane of restalrige on ye ane part & Thome ma
sone of Mdgistoun on ye vther part In maner forme & effect as fol
lowis that is to wit forgane Robert ye is bynd & oblist with his
Hart zairis fulfild & wtin ye said Robert Middleton plant & sawch
fruit of monie & poind Zeirdis & Synnis up stirkis qlk ye is on hand
be ane man The said Thome sall do his vttir & ze[a]rt diligence to
seruice & fynd out & do all ze[a]rt & ingyne he can do to wynd him & his
fynd out ye said & ye grace of God after sall find ye said ane
mair sure & no-sill King his bow zair / Safand ye is vttar-
Diligens & Ingyne mar vrgit / ffor ye qlk ye said Robert sall
ye be ye said Thome fre & quyte & grantis ane ye said Thome ye first
part [illegible] & possessioun perp[etuall] on ye said Thome sall find
on his fynd his men & mayn & mony wtin or abut ye said place & fortal
and sall be partit ye first Nowell & Malanro / betwix zairis ane
said Robert & ye said Thome ye first part & ye said Thome ye first part
upone zair [illegible] & ophiris / and for ye said Thome his vtterm
[illegible] to ye said Robert on Pasch sultzeit of his said first part
or thereby gainwart in ane ordor the said Robert sall mak ye said
Thome first tytle & undispanit fre sasyne in maner forsaid bak & de
Witter ye said Thome beand distrenzeit sall in persons of ye said
Robert rentis & dewor his part forsaid / ad a full discharg of
all & zair part forsaid sufficient & perfect & dewor / and ane
new & ane dobar & plant sing but ye destroying of his [illegible]
[illegible] ane albeit ye is of ane effort / And incase ye said Thome
[illegible] pasis be zair ane all tyme & vttar diligens to
ye said Robert Ffor the qlk ye said Robert & his aris & assignais
ye said Thome his aris & assignais ane & ilk ane of thame
for him & his aris & assignais to be observit & kepit be thame ye said party
to other gud trew & leill promyis ane ye said party
[illegible]

Robert Logane
of restalrige

Thome maxwell of Middistoun

folowis:—To wit, forsamekle as ther is dywerss ald reportis motiffis and appirancis, that thair suld be within the said Robertis dwellinge place of Fascastell a soum of monie and poiss, heid and hurdit up secritlie, quilk as yit is on fund be ony man. The said Jhone sall do his utter and exact diligens to serche and sik out, and be al craft and ingyne that he dow, to tempt, trye, and find out the sam, and be the grace of God, ather sall find the sam, or than mak it suir that na sik thing hes been thair; sa far as his utter trawell diligens and ingyne may reach. For the quilk the said Robert sall giff, as be the tenour heirof, giffiis and grantis unto the said Jhone the just third pairt of quhatsoewir poiss or heid treasour the said Jhone sall find, or beis fund be his moyan and ingyn, within or abut the said place of Falscastell, and that to be pairtit be just wecht and balance, betwix thaim but ony fraud, stryff, debait, and contention, on sik maner as the said Robert sall heff the just twa partis, and the said Jhone the just third pairt thereof upone thair fayth, truth, and consciens. And for the said Jhonis suir return and saiff bakcumming tharwith to Edinbruch, on beand * spulzeit of his said thrid pairt, or utherways hairmit in body, or geir, the said Robert sall mak the said Jhone saiff convoy, and accumpanie him saifflie in maner forsaid bak to Edinburgh, quher the said Jhone, beand saiflie returnit, sall, in presens of the said Robert, cancell and destroy this present contract, as a full discherg of ather of thair pairtis honestlie satisfiet and performit to utheris; and ordanis that na uther discherge heirof but the destroying of this present contract sal be of ony awaill, forse, or effect. And incaiss the said Jhone sal find na poiss to be thair eftir all tryall and utter diligens tane; he referris the satisfactione of his trawell and painis to the discretione of the said Robert.—In witnes of thir presens, and of al honestie, fideletie, fayth, and uprycht doing to be observit and keipit be bayth the saidis pairtis to uther, thei heff subscrywit thir presentis with thair handis at Edinbruch, day and yeir forsaid.

"ROBERT LOGANE *of Restalrige.*
"JHONE NEPER, *Fear of Merchistoun.*" †

* Without being.

† Logan's part in the Gowrie conspiracy was not detected until after his death, and by singular good fortune he died in his bed, before 1609. In that year one Sprot, a notary, was such an idiot as to drop a hint that he knew something of the matter, and even that he had stolen Logan's letters from the old messenger "Laird Bour." This was sufficient to bring upon himself the extremity of torture, and the most ignominious death. His depositions were taken before the privy-council; the letters were produced, and identified with Logan's hand-writing, *comparatione literarum.* Lo-

The existence of this singular contract has been hitherto only partially known through the medium of Mr Wood's edition of Douglas's Peerage, from a communication to that gentleman by the late Lord Napier; but the details of it have been nowhere published, and the matter remained wrapt in such mystery as might lead sceptical antiquaries to suppose that there was some misapprehension on the subject. Upon examining, however, the original document, we discover a circumstance which adds greatly to its interest and antiquarian value. The entire contract, with the exception of Logan's own signature, is carefully written by the hand of John Napier himself. There is no question of the fact; and it is even apparent, on comparing (as may be done in the fac-simile here given) the "Jhone Neper" of the signature with that which occurs in the body of the deed.

Having displayed this page of his history, and picture of his times, to the public eye, it is necessary to meet two ideas very naturally arising from a hasty view of the transaction. It may appear to call in question both his moral conduct and his mental power. The first idea is easily dealt with. The circumstance of this casual intercourse with one of the darkest characters of his times, for the special purpose detailed in the contract, is totally innoxious against the author of the Plain Discovery,—the friend of Robert Pont,—the leading commissioner of the assembled church,—and he who only six months before wrote the letter of Christian admonition to King James, which has been quoted. All this, and the fact, that during an age of tyrannical superstition,

gan's mouldering bones were dug up, produced in court, tried, condemned and executed. Sprot was led to the scaffold for his pains, where he adhered to his extraordinary confession in the face of a vast and attentive multitude; and, says Spotswood, gave the people a sign of his truth, "by clapping his hands three several times after he was cast off by the executioner." The letters, depositions, &c. were all, by command of the king, engrossed in the records of the Parliament of Scotland; and the original letters themselves have recently been discovered in the Register-House. They have been called forgeries; but the weight of evidence in support of their authenticity seems irresistible. It is interesting to institute the *comparatio literarum* now, which Napier was too wise to allow to be made at the trial of Logan's bones. This the reader may do by comparing the signature of the contract with the fac-similes of the letters in Pitcairn's Trials. The "Restalrige" in both are certainly very similar; but this must be observed; the dittay against Logan specially narrates, that the letters were subscribed "*efter his accustomet maner*, with this woird *Restalrig*;" whereas the contract has his name in full. Napier's cousin-german, the Bishop of Orkney's eldest son, (first Lord Holyroodhouse,) was one of the assessors on the trial of Sprot, attended him on the scaffold, and attested his dying confession.

no breath of slander or persecution ever visited Napier alive or dead, though he had the reputation of such dangerous powers, leave his character invulnerable. The singularity of his holding conference with one who had just been proclaimed an outlaw, and whose lawless violence is alluded to and provided against by Napier himself, must be accounted for by the rude state of society, and the simplicity of our philosopher's character. He took care to word the contract himself, however, and there is not an expression which indicates an idea beyond the most legitimate purpose; but, under the shield of his own innocence, he never dreamt of contamination from his company; was fond of the romance of science; and not averse (nothing derogatory in his times) to the prospect of gold. We must admire, moreover, the undaunted courage of the man, who was willing to go alone with the robber to his cave, and only stipulated for a safe convoy back again to prevent his being robbed by Logan's own domestics. To pronounce the transaction mercenary would be to apply the fallacious test of modern notions to the dimly seen manners of antiquity. As the deed is still in existence, we must suppose that the terms of it had not been fulfilled; nor is it improbable that no faith had been kept by Robert Logan; but the idea is too picturesque to be entirely discarded, that the philosopher actually went to the dreary castle overhanging the German Ocean; that there, in his gown and cowl, he sat betwixt the wild Earl of Bothwell and the turbulent Restalrig, both armed to the teeth; that he partook of their "daynty cheir—fyne hattit kit with succar, comfeitis and wyn;" and that the necromantic nobleman and the lawless chief bowed before the pure but mighty mind, for whom the destiny was yet in store to become the universal benefactor of science and the arts. Whether he found the treasure, or got back to Merchiston "on beand spulzeit of his said thrid pairt, or utherways hairmit in body or geir," is another matter. But that the reader may be assured that John Napier immediately dropt the acquaintance, and foreswore the society of Robert Logan, we shall lay before him the preamble of a lease among the philosopher's papers. "At Gartnes, the xiiij day of September, the yeir of God a thousand, five hundreth, fourscoir saxtein yeirs; it is agreit betwix Johne Neper, fear of Merchistoune, and Robert Neper of Blackyairdis as cationer for him, on the ane pairt; and Johne Cunynghame of Ross, principall," &c. "on the uther pairt, as followis, to witt,—The said Johne Neper sall sett to the said Johne Cunynghame of Ross, and his subtennentis, labourers of the ground, *allanerlie nocht of the surname of*

Loganes, nor Cunynghames of the houss of Drumquhassell, all and haill the four pund landis of Blairour," &c.; and further on in the same deed the condition is more positively repeated, that the lessee oblige himself that he " nather directlie nor undirectlie, nor yitt be na maner of pactioun, private or publicke, sall suffer or permit ony persoune beirand *the name of Logane,* or Cunynghame of the houss of Drumquhassell, to enter the possessioun,"* &c.

As a page in the intellectual history of mankind, the contract now before the reader affords matter for curious and interesting reflection. It is well known, that, at the period of its date, the chrysalis of the adept was still hanging upon the brilliant wings of science, and that superstition darkened the fountains of justice with innocent blood. Astronomy had not yet escaped from judicial astrology; nor chemistry from alchemy; nor mathematics from magic squares and mysterious powers of numbers; nor *(horresco referens)* the High Court of Justiciary from its belief in witchcraft. We are prepared in short, by the history of that age, by the lives of its most illustrious ornaments, from Cardan to Kepler, for any absurdity, however wild and baseless, proceeding from any intellect, however powerful and profound. But there is something in this little quiet Scotch contract, entered into betwixt the *best* man and the *worst* man whom Scotland then held, more startling than the Harmonices Mundi of the imaginative German philosopher, or the folly of Tycho Brahe and his prophetical idiot. † Most of these instances of superstí-

* Cunninghame of Drumquhassil was a distinguished, but not a respected, statesman, in the minority of James VI. He is mentioned as the cautioner for the philosopher's father in two thousand pounds, when the regency confined Napier after the battle of Langside in 1568. But his fate in 1585, may account for the horror taken to his house by John Napier. Moysie thus records it:—" About the letter end of Januar, theare wes a conspiracie discoverit by Hamiltoun of Inchemachane, anent the taking of the king at the hunting, or careing him to the Merse, be the Erle of Angus and Maris confederates, or killing him unnaturally. Quairupone Duntreathe, Drumquhassil, and the Laird of Maynes, being teane and accusit, Duntreathe confest, and fyled; Drumquhassel and Maines, quha wold never confes, they wer execut; and Duntreathe spaired for his confessioun."—P. 52.

† Tycho was very superstitious. If, on going out of his house, he met an old woman or a hare, he invariably turned back. During his reign at Uraniburg he kept a fool of the name of Lep, who sat at his feet at dinner time, and was fed by the hands of the philosopher. Lep was a prophet, at least Tycho believed so and noted all his predictions carefully.—*See Tycho's Life by Gassendi,* p. 229; and *Memoirs of Men Illustrious in the Republic of Letters, by Niceron,* T. xv. p. 170.

tion create disgust from their extravagance, or doubt from the vagueness of the record; but here is a page of such chastened and decent magic, so authentically recorded, and soberly set down by the same hand that set down the *Canon Mirificus Logarithmorum*, that common sense herself might pause to consider it.

There is no ostentatious display of the terms of magic in the deed; but that something romantic is meant cannot be doubted, as the words will bear no ordinary interpretation. "The said Jhone sall do his utter and exact diligens to serche and sik out, and be al craft and ingyne that he dow, to tempt, try, and find out a soum of monie and poiss heid and hurdit up secretlie, quhilk as yit is on fund be ony man," some where in the Dom Daniel of Fastcastle, indicate that the mattock and the spade had been tried in vain, and that the blackest art of the Earl of Bothwell had failed, but that there was still a hope from the power of Napier. It is nothing extraordinary that a rude and turbulent baron should have formed this idea; but that Napier himself should have accepted the reference, and so gravely written its conditions with his own hand, is very inexplicable in one who was most assuredly neither a charlatan, nor given to jesting with such characters as Logan; and who is unrecorded as having displayed any public pretensions to the character of that

> "Cunning man, hight SIDROPHEL,
> That deals in destiny's dark counsels,
> And sage opinions of the moon sells;
> To whom all people, far and near,
> On deep importances repair;
> When brass and pewter hap to stray,
> And linen slinks out of the way." *

The Sidrophel of Butler was none other than the famous William Lilly, who wrote the history of his own life and times. He was nearly a contemporary of Napier's, and well acquainted with those who knew him; but, in his notices of our philosopher, he imputes nothing to his character beyond the

* When Hudibras discomfits Sidrophel, and asserts the right of conquest by rifling his pockets, he therein finds *inter alia*,

> A moon-dial with Napier's bones,
> And several constellation stones
> Engraved in planetary hours,
> That over mortals had strange powers.

most respectable department of the romance of science. "Lord Merchiston," says he, "was a great lover of astrology, but Briggs the most satirical man against it that hath been known. But the reason hereof I conceive was, that Briggs was a severe Presbyterian, and wholly conversant with persons of that judgement; whereas the Lord Marchiston was a general scholar, and deeply read in all divine and human histories. It is the same Marchiston who made that most serious and learned exposition upon the Revelation of St John, which is the best that ever yet appeared in the world." *

A scene was witnessed by Sidrophel himself, just forty years after Napier's contract with Logan, which is the best illustration I can find of what may, possibly, be indicated by that curious document. "Two accidents," says Lilly, "happened to me in that year something memorable. Davy Ramsay, his majesty's clock-maker, had been informed that there was a great quantity of treasure buried in the cloyster of Westminster Abbey; he acquaints Dean Williams therewith, who was also then Bishop of Lincoln; the Dean gave him liberty to search after it, with this proviso, that, if any was discovered, his church should have a share of it. Davy Ramsay finds out one John Scott, who pretended the use of the Mosaical rods to assist him herein. I was desired to join with him, unto which I consented. One winter's night, Davy Ramsay, with several gentlemen, myself, and Scott, entered the cloysters.† We played the hazel-rod round about the cloyster; upon the west side of the cloysters the rods turned one over another, an argument that the treasure was there. The labourers digged at least six foot deep, and then we met with a coffin; but in regard it was not heavy, we did not open, which we afterwards much repented. From the cloysters we went into the abbey church, where

* William Lilly's History of his Life and Times, from the year 1602 to 1681. Written by Himself in the sixty-sixth year of his age to his worthy friend, Elias Ashmole, Esq." Edit. 1822, p. 237.

† Elias Ashmole, whom Lilly calls "Arts great Mecænas, noble Esquire Ashmole," has illustrated his friend's journal with a few notes. He seems to have been well acquainted with this anecdote, and notes, that "Davy Ramsay brought an half quartern sack to put the treasure in." Sir Walter Scott honours Davy too much in classification. "Master Ramsay was often accustomed to retreat to the labour of his abstruse calculations; for he aimed at improvement and discoveries in his own art, and sometimes pushed his researches *like Napier*, and other mathematicians of the period, into abstract science." He also makes the scientific constructor of horologes, when irate against his apprentices, swear "by the bones of the immortal Napier."—*Fortunes of Nigel.*

upon a sudden (there being no wind when we began,) so fierce, so high, so blustering and loud a wind did rise, that we verily believed the west end of the church would have fallen upon us. Our rods would not move at all; the candles and torches, all but one, were extinguished, or burned very dimly. John Scott, my partner, was amazed, looked pale, knew not what to think or do, until I gave directions and command to *dismiss the demons;* which, when done, all was quiet again, and each man returned unto his lodging late, about twelve o'clock at night. I could never since be induced to join with any in such-like actions. The true miscarriage of the business was by reason of so many people being present at the operation; for there was about thirty, some laughing, others deriding us; so that, if we had not dismissed the demons, I believe most part of the abbey church had been blown down. Secrecy and intelligent operators, with a strong confidence and knowledge of what they are doing, are best for this work." *

Such was the state of the art in question, in the times and in the hands of Lilly; but we suspect it must have degenerated during the years that had elapsed since Napier practised it, from some more scientific, or at least more innocent mode of operation. What he proposed to do was by "the grace of God;" and had the two dark outlaws, whom he may have met at Fastcastle, required of him to exercise any control over demons, he would probably have answered in the spirit of Sampson Agonistes,

> I know no spells, use no forbidden arts;
> My trust is in the living God, who gave me
> At my nativity this strength.

One circumstance must be observed in reference to the characteristic trait we are considering, that Napier was brought into close and constant contact with practical operations, the most likely in the world to imbue him with all the enthusiastic fancies, then so current, upon the subject of discovering the occult recesses and properties of the precious metals. Since the year 1582, his father, Sir Archibald, had been master of the mint, with the sole superintending charge of the mines and minerals within the realm. In those times, the soil of Scotland was supposed to be teeming with gold and other precious metals. Mr Chalmers, in his Caledonia, informs us, that "James IV., who was a great dabbler in alchemy, appears to have

* Lilly's History, p. 78.

wrought some mines in Crawford-Muire. In the treasurer's accounts of 1511, 1512, and 1513, there are a number of payments to Sir James Pettigrew and the men who were employed under him in working the mine of Crawford-Muire. There are also payments of wages to Sebald Northberge, the master-finer, to Andrew Ireland, the finer, and to Gerard Essemer, a Dutchman, the melter of the mine. At Wynlockhead, on the Nithsdale side of the Leadhills, a lead mine was wrought in 1512 by some of the workmen who were employed by James IV."* The next monarch in like manner, and with greater success, patronized this royal and delightful sport. It appears from the *Acta Dominorum Concilii*, that in the year 1526, a company of Germans obtained a grant from James V. of the precious mines in Scotland for forty-three years, and were much encouraged. Bishop Lesley declares that these foreigners worked for many months most laboriously in Clydesdale, seeming to be only employed in rolling up great balls of earth; from which, however, they enriched themselves, by extracting quantities of the purest gold.† These operations probably introduced into Scotland much scientific knowledge on the subject, mingled with the wilder aspirations of the adept.

Sir Archibald Napier seems to have forsaken his legal pursuits not many years after he held the office of justice-depute, in order to betake himself to this seducing craft; and he became the most expert man in his own country at detecting gold amid the grosser elements of creation, refining it for human purposes, and, finally, at regulating the whole preparatives of its legal circulation in the realm. In the preface to a translation of the Life of James V., written in French and printed at Paris 1612, it is stated, upon the authority of a manuscript in the Cotton Library, that, "In King James the Fifth's time, 300 men were employed for several summers in washing of gold, of which they got above L. 100,000 of English money. By the same way, *the Laird of Merchiston got gold in Pentland Hills.*"‡ I have not had the advantage of inspecting the manuscript; but there can be no question that this was the father of our philosopher. In the Balcarres collection of original manuscripts, belonging to the Advocates' Library, there is a mass of papers relating to the "Cunzie" of Scotland, in which the names of Sir Archibald Napier and his son Francis figure very conspicuously. From these it appears, that,

* Caledonia, Vol. iii. p. 732.

† *De Rebus Gestis Scotorum.* Romæ, 1578, p. 452.

‡ Miscellanea Scotica, Vol. iv. p. 100.

about the year 1582–83, the former had been appointed to an office, the limits of which seem not to have been very accurately defined, but under which he was styled General of the Mint.* In 1592, after Sir Archibald had held this appointment above nine years, an act of Parliament was passed, creating a new office in that department in favour of the celebrated Mr John Lindsay, who soon after became Lord Privy-Seal, and then Secretary of State, as one of the Octavians, or eight commissioners of Exchequer, who for a time ruled Scotland.† The act narrates that his Majesty, knowing Lindsay's qualifications, and his "travellis in seiking out and discovering of dyvers metallis of great valor within this realme, and in sending to England, Germanie, and Denmark, to gett the perfite essey and knawledge thairof," appoints him to this new office of master of the metallis. The same act bears, "That forsamekle as Thomas Foullis, gouldsmyth, *has found out the ingyne and moyene* to caus melt and fyne the vris (ores) of metallis within this cuntrie, and hes brocht in strangearis," &c.; therefore ratifies to him the gift of "the said melting and refyning of all and quhatsumevir vris of metallis won and wrocht within this countrie," &c.

These proceedings gave great offence to Sir Archibald Napier, who seems to have viewed the whole matter in the light of a rash experiment on the part of the king, at the instigation of those who had nothing in view but their own private interests, and no knowledge or experience in the particular craft. He accordingly opposed these measures in his place in Parliament, and recorded a formal protest against them.‡ Besides this, he drew up for the

* In the year 1587, "Sir Archibald Naper of Edinbellie, Knicht, Generall of his Hienes Cunze-Hous," is joined in commission with his cousin-german, "Sir Robert Melville of Murdocairnie, Knicht, Thesaurare-depute," and a few others, whose ordinance is to have the force of an act of Parliament, "for setting of the quantitie of the bulzeon to be brocht to the cunze-hous" for all manner of exported goods liable to custom.—*Acts of the Scottish Parl.*

† John Lindsay, commonly called Parson of Menmure, from holding that rectory, was the second son of Sir David Lindsay of Edzell and Glenesk, and the father of David first Lord Lindsay of Balcarras. He was a Lord of Session, and highly distinguished as a statesman.—*See the History of his Times, passim.*

‡ "The Laird of Merchanstounis Protestatioun:"—"Sir Archebald Naper of Edinbillie, Knicht, as commissioner for the Shrefdome of Edinburgh, principall, be his vote, dissasentis fra the dissolutioun of the mynis, and setting of the same in few, efter the maner proponit; be reasone the same is proponit *cum diminutione*, for payment now allanerlie of ane hundreth stane of ilk thousand, quheras the mynis payit of befoir fiftie unce utter fine silver of ilk thousand stane, qlk is neirly four tymes alsmekle proffite as the offer proponit; as alsua protestis, as Generall of his Ma-

Lords of Council, in his own name and that of his son Francis, who was finer and assey-master under him, answers to the " particular heads of the act of affyning, maid at Linlithgow 8th March 1591, in favors of Thomas Foulis." This paper is in the Balcarres collection, and the characteristic remarks it contains enables us to form some judgment of Sir Archibald's activity in this matter, and the nature of his occupations. To the first head, " quhair the said Thomas suld big ane strong and lairge hous upone his awin expensis; for anseir heirto; gif it be upone Thomas awin expensis we querrell it not; bot gif it be upon his majesties, as appeiris be the letter pairt of the said act, we think that bigging to be sumptuous and inuteill; be ressoun the money micht be affynit in ony convenient hous in Edinburgh." He expresses great misgivings as to the public utility of the scheme, " and thairfoir," says he, " we desyre your Lordschippis to inquyre of the said Thomas quhat free proffeit his majestie will ressave upone ilk stane wecht being affynit and prentit, all maner of deductions being deduceit; and thairefter we sall latt your Lordschippis understand ane uther plat concerning the money, quairupone his hienes and your Lordschippis may juge, and tak the best and maist proffitable." He doubts exceedingly the affyning qualifications of Foulis and his strangers; and urges that " the said affyning aucht to be maid in presens of the wardens and essayer of the Cunziehous onlie; for gif sum controlement heirof be not usit be the maist expert of the Cunziehous, the saids effyneris may mak mair nor xl^{m} pundis [L. 40,000] of proffeit to thameselffis, and never kennell ane fyre for effyning thairof. Gif your Lordschippis pleissis to know the maner heirof, the same sal be evidentlie declairit in presens of his majestie and your Lordschippis, quhilkis wer langsum now to rehers. And in caice the said Thomas Fowlis will object, that his saidis straingearis will permit na qualifeit officiar of the Cunziehous to see and controill their said wark, it is answerit, we desyre not to see thair craft of effynings, bot allanerlie how mekle and quhat spaceis of *guid money they demoleis*, seing thair is na grit craft in demolesching, for *everie tinklair can do the samin*," &c.

In like manner Sir Archibald canvasses very severely the act of appointment in favour of Mr John Lindsay; and from his strictures, also among the

jestie's Cunzehous, that na collectoire be appointit over the ingaddering of his Majestie's deutie of the mynis, except the Generall of his Majestie's cunziehous; and that becaus it is ane pairt of the said Generallis office, quhereof he and his predicessouris generallis hes bene hitherto in use."—[1592.] *Acts of Parl.* iii. 559.

Balcarres papers, we find some minute particulars in reference to his own craft and a history of the mines and the mint of Scotland.* He contrasts the terms of the old leases with the schemes now proposed, which, he does not hesitate to affirm against Mr Lindsay, are "ane substantius ground to mak himself ane havie purs." He informs us, that "the mynis hes bene sett heirtofoir to Johnne Achesoun and John Coslon; and to James Johnstoun of Kelliebaukis, Cornelius de Vos, George Douglas of Parkheid, Abraham Petersoun, his pertineris, and Mr Eustatius," upon terms much more advantageous to the king and country than those contained in the new act; and he adds, "I find na commoditie be this act to the finder, nochtwithstanding it wer the kingis majesties proffit to appoint ane ressonabill portioun thereof to *quhatsumever man that wald discover ony myne.*" Speaking of himself, he says, "there is ane officiar appointed alredde, quha hes the oversycht of the mynis, hes servit and presentlie servis therinto, gadderis up the king's dewties thairof, and being commanded, will serve therintill upon his accustomet wages; evin the generall of the Cunziehous, quha is redde to abyd tryell of his qualificatioun."

His qualification seems to have been the result of assiduous practice and great experience, in the course of which the attention of his philosophical son must have been more or less attracted to these matters. In asserting his own right to be master of the metals, exclusive of Lindsay, he adds, "the present maister of the mettallis, to wit, the generall of the Cunziehous hes *thir money*

* There is a very full and curious manuscript entitled "The Discovery and Historie of the Mynes in Scotland" among the MSS. of Sir Robert Sibbald belonging to the Advocates' Library; written in a wild fantastical strain, but full of minute and interesting information. It was printed for the Bannatyne Club, with copious notes and illustrations, by Gilbert Laing Meason, Esq. in 1825, and is one of their rarest, consequently most valuable, volumes. It ought to be reprinted with the additional illustrations to be obtained from the Balcarres MSS. In the notes I find it said, "It is not very clear who the foreigner was alluded to in an act of Parliament, 5th June 1592, as then enjoying a lease of the gold mines, although it may probably have been Bronckhorst," p. 110. Sir Archibald Napier's papers, however, in the Balcarres collection, prove that it was "Eustathius Roghe Mediciner," who had been tacksman under Merchiston since the year 1584. The privy-council took Sir Archibald's opinion as to the force and effect of this tack in reference to the act in favour of Lindsay; who returned for answer, that it was absolutely necessary to reduce the tack, and pointed out the proper grounds upon which to libel the summons. An action was raised accordingly, in which, *inter alia*, it is narrated against the defender, that, "being ane stranger of evill fame at hame in his awin cuntre, hes manifestlie circumventit us," &c. The tack was reduced.

yeiris bygaine, be himself and his deputis merkit barrellis, keippit register of the quantitie, and hes gevin up to the kingis majesties thesaurer compt of all the (ores) of mettallis, as heirtofoir hes bein transportit out of the cuntre."—"Let the generallis qualificatioun be conferrit with Mr Johnne Lindsayis in this facultie, and quhilk of them can baith gif best resounis and *work it with thair handis*, (utherways thei may be decavit,) have this office."—"The generall can and will quhenever he is chargit, baith work in small and greit, and hes lernit utheris to do the same als perfytlie, and with less expensis nor ony strangaris that sall cum within this cuntre is hable to do." *

The parson of Menmure had no idea of submitting quietly to these animadversions, and, accordingly, recriminates very much in the style of a modern reformer attacking one whom he alleges to be growing fat upon old abuses. When Sir Archibald's sharp-sightedness seems to have penetrated too far, Lindsay observes, "it mervelis me quhou Merchinstone can have onie ground or fundament of his rakning," &c. "except it be *be the spirit of divination*;" a gibe he is very fond of casting at the laird, for he repeats, "this is founded upon the spirit of divination, propheticallie affirming," &c. "I will answer conforme to the Scripture, that gif the contrarie be found in effect, lat that prophet be estemit untrew," &c. He then rides rough-shod over Sir Archibald's experience; "he may be weill better versit in bellices and fornaces nor I, and sua have mair knauleg; bot vertu is in action, and noth in contemplatioun; and I believe that I sall schaw better effect of my office in ane year nor *he hes done in nyne*;" and, finally, he adds, what will give us a more complete, though somewhat distorted, view of the vocation of our philosopher's father: "To conclude, I desyre your Lordships to tak the general's gryt aith upon sik sems of metals as he hes found, and knawis to be in Scotland; of the profit quherof it is na resone that his majestie and the cuntrie sould be defraudit be his *malicius silence*; and gif he sweris that he knawis nain, I wil offer to prove that divers tymes he hes avowet that he knawis and hes tentit ane copper sem neir the sie, fyve myle lang, quhilk sem I will be content to have in tak, or oni uther sem quhilk he hes found, he making ane resonable offer to the king of the fourt pairt free,

* Sir Archibald also says, "Mr Johnne Lindsay and Thomas Fowlis hes leid subtill platis to bring the haill mynis of this cuntrie in thair awin hands allanerlie;" and he concludes, "I prey you my Lordis gif attendence to the subtill mening of this act, and provyd remeid thairfor in tyme; utherwyis the burdein therof lyes upoun your Lordschips; for I haif exonerat myself heir to your Lordships; and also in Parliament be my protestatioun tane in the contrair of this present act." *Balcarres Papers*, Vol. ix.

quhilk he sayis wes the auld dewtie, or oni uther dewtie quhilk your Lordships sall find reasonable. Nixt, I desyre your Lordships to caus him produce his gift of the office of General of the Cunziehouse, togidder with all the contracts of the stamping, forgin, and reforgin of the cunzie, with the compts thairof, and haill warrandis, that they may be delyverit to me, and that I may have libertie to mak notis and observationis, as he hes done against me; and quher he, *be the spirit of divination*, * alleges that I will do wrang and hurt the king, I will offer me to prove sufficientlie, that, be his stamping and forgin over of the cunzie, he hes actuallie done ane verie gryt hurt baith to his majestie and to the hail cuntrie; and als that his awen office is not onlie ane new office, himself beand bot the second generall that ever was in Scotland, bot also is altogidder pernitius to the king and cuntrie, in sa far as he hes yeirlie of his majestie neir ane thousand merkis in feis ordinar and extraordinar, besyde the allowance of the expensis of sum of his voyages to Dumfermeling, &c. as gif he war ane pursuivant; for the quhilkis feis himself is not abill to schaw quhat gude and proffitabill service he dois to his majestie; alwayis, of ressoun and justice, your Lordships will not refuis to me the lyke libertie to gif in artiklis againis him as he hes done againis me, that, be our contradictioun, his majesteis proffeit may appeir, and quhilk of us is *servus nequam*."

The most complete defence of Sir Archibald Napier from the *tu quoque* attack of this fiery and powerful Octavian, is to be found in the fact, that, twelve years from this time, and long after the Parson of Menmure had been gathered to his fathers, he is still in the same office, and in the highest repute. Balfour records, that upon the "10 September 1604, Napier, Laird of Merchistoun, General of the Cunzie House, went to London to treat with the English commissioners anent the cunzie, who, to the *great amazement* of the English, carried his business with a great deal of dexterity and skill; and, having concluded the business he went for, he returned home in December thereafter." By what particular display of the golden art he amazed the

* It is curious to observe that both Lindsay's son, and Sir Archibald's grandson, wrote on the occult sciences. It is mentioned by Mr Wood in the peerage, quoting the Lindsay MSS. and speaking of David first Lord Lindsay of Balcarres, "there is in the library at Balcarres *ten volumes* wrote by his own hand, upon the then fashionable subject of the philosopher's stone." Robert Napier's treatise on the same subject is noticed p. 236.

† Balfour's Annals, *MS. Advocates' Library*. These were printed some years since in three vols. 8vo, by Messrs Haig of the Advocates' Library.

savans of the sister kingdom is not recorded; but the matter seems to have attracted universal attention, for honest Robert Birrell in his contemporary diary thus notes the occurrence: "The 10th of September, the General Maister of the Cunziehous tuik shipping to Lundone, for the defence of the Scottis cunzie befoir the counsell of Ingland, quha defendit the same to the uttirmost; and the wit and knawledge of the General *wes wunderit at* be the Englischmen."

Thus, independently of the natural leaning of a profound mind (in days when the limits of human power were not so clearly defined as now) towards the occult sciences, our philosopher had to sustain unusual temptations from his daily contact with the mysteries of mining, and the brilliant hopes and tempting jargon of the searchers for gold,—with their "saxere stones," and "calamineere stones," and "salineere stones as small as the mustard seede, and some like meall; and the sappar stone in lumps, like unto the fowles eyes, or bird's eggs; and, the most strangest of all, naturall gold linked fast unto the sapper stone, even as vaines of lead-ewer and white sparrs doe growe togeather," *—and all this in Scotland before the seventeenth century! The wonder is not that he was infected with what we have ventured to call the romance of science, but that all his writings, theological and philosophical, should be entirely free from a vestige of such propensities. Whatever pranks he may have played in the cellars at Fastcastle, the moment he set fairly to work with his head, it grew clearer the more profound it became, and cooler the further it penetrated.

The superstition so subdued in him was decidedly manifested in many of his contemporary relatives. His uncle the Bishop of Orkney was said to be a "sorcerer and execrable magitian." † Of this there is scarcely sufficient proof; but

* Stephen Atkinson's MS. on the gold mines in Scotland.—*Advocates' Library.*

He also says that Cornelius, the lapidary, (whom Sir Archibald Napier mentions as a tacksman of the mines) "consulted with his friends at Edinburgh, and, by his persuasions, provoked them to adventure with him, showing them first the natural gold, which he called the temptable gold, or alluring gold. It was in sternes, and some like unto bird's eyes and eggs; he compared it unto a woman's eye, which intiseth hir joyes into hir bosome."

† There has been lately discovered in the Register House a Scotch MS. chronicle, embracing an apology for Queen Mary, and an exposure of the faction by which she was destroyed. The

his cousin Sir James Melville, who had seen the world under every aspect and breath of Heaven, was an unhesitating believer in necromancy, though he never practised it. He narrates among his youthful adventures, that, while under the charge of the Bishop of Valence in Paris, before becoming the secretary of Montmorency, two great scholars and mathematicians, *Cavatius* and *Taggot*, frequented the bishop's house. Cavatius gravely informed the prelate that there was an old shepherd in Paris to whom had been bequeathed the singular legacy of two familiar spirits, from a priest whose servant the shepherd had been. Valence thought this so great a curiosity that he led the mathematician into the presence of Henry II. before whom Cavatius offered to lose his head, if he did not produce those very spirits, either in the shape of dogs or cats, as might be most agreeable. But the king took a very sensible, though unexpected view of the matter; "he caused burn the schephird, and imprisonit the said Cavatius, and wald not see the saidis spritis." As for Taggot, "he," says Melville, "had learnit be the art of palmestrie, as he said to me himself, that he wald die before he atteanit unto the age of twenty-eight years. Wherfore, said he, I know the trew religion to be exercysed at Geneva; there will I go and end in Godis service. Sa he did, and died ther at Lausan, as he had conscavit the opinion; as I gat word afterwart." This was in the year 1553. Six years afterwards, when Melville was returning to France from his first embassy to Scotland, he "fell in company with ane Englishman, wha was ane of the queenis varletis of hir chamber; a man learnit in mathematik, necromancye, astrologie, and was also a gud geographe." This man entertained Melville with a long story about Harry VIII. having been "sa curious as till enquyre at men callit devyners and negromanciens, what suld becom of his sone K. Edward 6. and of his twa dochters Mary and Elysabeth;" and that all their fate had been accurately foretold. "This," says Melville, "the honest man affirmed to be true, and not knawen till

language and expressions clearly indicate a contemporary production. Speaking of the convention of estates after Mary's forced abdication, this writer says "they caused thither to come to represent the ecclesiastical estate and spiritualitie, the venerable, often perjured and foirsworne father, Mr Adam Boithwell, whom, for this purpose, they befoirhand helped to be made Bischope of the Orcades, *a camelion, a sorcerar*, and *execrable magitian*," *&c.* For the perusal of this curious manuscript, which seems to be either the original, or a contemporary translation of Adam Blackwood's *Martyre de Maria Stuart*, I am indebted to the never-failing attention of Mr Macdonald of the Register House.

many. He was a man of gret gravitie, about fifty years of age; and when we cam to London, he schew me gret courtesie, and made me presents of some bukis." Our philosopher had another cousin who actually died of fright at the result of an incantation. Sir Lewis, the son of Sir John Bellenden, though quite a youth when his father died, stepped immediately into his office and state career. After he had become experienced and notorious as a statesman, he chose to have dealings with that dangerous person Richard Graham, of whose evil company Francis Earl of Bothwell was accused. In the year 1591, the justice-clerk, "by curiosity dealt with a warlock called Richard Graham to raise the Devil, who having raised him, in his (Bellenden's) own yard in the Canongate, he was thereby so terrified that he took sickness and there died."*

Robert Napier, the philosopher's second son of his second marriage, and through whom his lineal male representation is now held,† affords a remarkable instance of the superstition of the family; and this is curious, as he was the favourite son to whom John Napier bequeathed the care of his younger children, and the editorial charge of his unpublished works. Among the Merchiston papers I find a thin quarto volume in manuscript, closely written in the autograph of Robert Napier. It is addressed to his son, and upon the first leaf appears an injunction which we may presume to be now entitled to as little consideration as a freehold superiority in Scotland since the act of the Reform Parliament. "This book to remaine in my charter-chist, and not to be made knowne to any except to some neir freind, being a scholler, studious of this science, who feares God, and is endewed with great secrecie not to reveil and mak commune such misteries as God hes apointed to be keipit secrit among a few in all ages, whoes harts ar upright towards God, and not given to worldly ambitione or covetousnes, but secretly to do gud and help the poor and indigent in this world, as they wold eschew the curse of God if they do otherways,

"R. NAPIER."‡

* Scott's Staggering State, p. 131.

† By Sir William Milliken Napier of Napier and Milliken, Bart.

‡ "In the Green Lion's bed, the sun and the moon are born; they are married and beget a king. The king feeds on the lion's blood, which is the king's father and mother, who are at the same time his brother and sister. I fear I betray the secrete which I promised my master to conceal in dark speech from every one that does not know how to rule the philosopher's fire. When you have fed your lion with sol and luna," &c.—*Abraham Andrew's Hunting of the Green Lion.*

The book is in Latin, and consists of a digest of all that is precious in alchemy or hermetic philosophy, being a revelation of the mystery of the Golden Fleece. It commences with a solemn address to his son. He tells him, " above all things embrace God with your whole heart and purity of mind; for without his guidance all is vanity, and especially in this divine science." He then strongly inculcates *secrecy* as the first essential duty of the hermetic art; " a madman," says he, " must not have a sword, and were these secrets to be divulged, the hind would become greedy of gold to his own destruction, and iniquities would cover the earth; mighty in their gold, nations would rush to war for nothing; the worthless would wax proud and scorn their rulers; and the reins of civil power and legitimate government being relaxed, an earthquake would follow. Oh! I say, reveal this secret to the vulgar, and the darkness of chaos shall again brood upon the face of the waters." Having thus enjoined secrecy, Robert Napier of Culcreuch, Esq. proceeds to give his reasons for pointing out to his son the path to the precious elixir; namely, that he might not waste his time in consulting books that would lead him astray, or ruin himself with the expences of an ill-directed search; and having sketched the plan of his work he thus concludes: " But, above all things, you my son, or whoever he be of my posterity who may chance to see and read this book, I adjure by the most holy Trinity, and under the pains of the curse of Heaven, not to make it public, nor to communicate it to a living soul, unless it be to a child of the art, a good man fearing God, and one who will cherish the secret of Hermes under the deepest silence. But if thou dost otherwise, accursed be thou! and, guilty before the throne of God, may every pain of that condemnation follow thee which Heaven in its wrath will visit upon him who reveals the shrine of Hermes to unhallowed eyes. God grant that my soul may be free from so deadly a sin; and, imploring him that no malign influence may direct this book into impious hands, I take his holy name to witness that I have written it only for the sake of the good, those who with sincere and pious hearts worship him, to whom be the honor, the praise, and the glory for ever and ever." *

* The title of the MS. is " Mysterii aurei velleris Revelatio; seu analysis philosophica qua nucleus veræ intentionis hermeticæ posteris Deum timentibus manifestatur. Authore R. N." And its motto,

Orbis quicquid opum, vel habet medicina salutis,
Omne Leo Geminis suppeditare potest.

The reader will excuse our penetrating farther into a work with so fearful a preface; but so much we may afford him, without falling under the *anathema maranatha* of this disciple of Hermes, as a very curious picture of the times, derived from one under whose auspices was published the revelation of a more humble secret,—his father's secret method of constructing the Logarithms.

In the Ashmolean Museum, Oxford, there is an original picture of Dr Richard Napier of necromantic memory, which in some features bears so strong a resemblance to the portraits of our philosopher, that they might easily pass for brothers. The relationship is not quite so close, though very nearly, as they were brothers' sons,—a fact not generally known. Alexander Napier of Merchiston killed at the battle of Pinkie, and who was so frequently abroad, had a son named Alexander, who came immediately after his eldest son Archibald, the philosopher's father. Alexander seems to have accompanied his father in some of his foreign excursions, and was left by him in England, probably at school, before the year 1548. Instead of returning to his country, young Alexander Napier established himself in Exeter, and married an English lady, Ann, a daughter of Edward Birchley, Esq. of Hertfordshire. Of this marriage there were two sons; Robert, the Turkey merchant, who became a baronet, as we have elsewhere particularly noted, and Richard, whose history and adventures we shall now sketch.

He was about eight years younger than the philosopher, and seems to have obtained all the advantages of a classical education; was fellow of Exeter College, Cambridge,—took a degree in that university,—and became rector of Lynford. In his youth, however, he attached himself to one of the lights of the Rosicrucian school, Dr Simon Forman. This celebrated adept, who, among many works of the kind, published one on the art of discovering hidden treasure and goods purloined, was rather successful as a physician, but much more so as a cheat. His character and occupations cannot be better displayed to the reader than in a single sentence written by himself in one of the books he left behind him, viz. " This I made the Devil write with his own hand in Lambeth Fields, 1596, in June or July, as I now remember." Under such auspices, it is not surprising if Doctor Richard Napier far excelled his Scotch cousin in the occult sciences. William Lilly, speaking of Forman's death, says, " all his rarities, secret manuscripts of what quality soever, Dr Napper of Lindford in Buckinghamshire had, who had been a long time his scholar; and of whom

Forman was used to say he would be a dunce; yet in continuance of time he proved a singular astrologer and physician."* The same author, who was personally acquainted with Richard Napier, adds, that his "family cam into England in King Henry the Eighth's time.† The parson was master-of-arts; but whether doctorated by degree, or courtesy because of his profession, I know not. Miscarrying one day in the pulpit, he never after used it; but all his lifetime kept in his house some excellent scholar or other to officiate for him, with allowance of a good salary. He outwent Forman in physic and holiness of life; cured the falling sickness perfectly by constellated rings; some diseases by amulets, &c. A maid was much afflicted with the falling-sickness, whose parents applied themselves unto him for cure. He framed her a constellated ring, upon wearing whereof she recovered perfectly. Her parents acquainted some scrupulous divines with the cure of their daughter; 'the cure is done by inchantment,' say they; 'cast away the ring, it's diabolical; God cannot bless you if you do not cast the ring away.' The ring was cast into the well, whereupon the maid became epileptical as formerly, and endured much misery for a long time. At last her parents cleansed the well, and recovered the ring again; the maid wore it, and her 'fits' took her no more. In this condition she was one year or two; which the puritan ministers there adjoining hearing, never left off till they procured her parents to cast the ring quite away; which done, the fits returned in such violence that they were enforced to apply to the doctor again, relating at large the whole story, humbly imploring his once more assistance; but he could not be procured to do anything, only said, 'those who despised God's mercies were not capable or worthy of enjoying them.' I was with him in 1632 or 1633 upon occasion. He had me up into his library, being excellently furnished with very choice books; there he prayed almost one hour; he invocated several angels in his prayer, viz. Michael, ‡ Ga-

* Lilly's Life and Times, p. 44.

† There were two distinct branches of the Napiers of Merchiston in England. James, a younger son of Archibald fourth of Merchiston, settled in England in the reign of Henry VII. His sons all founded wealthy and distinguished families, and his grandson was Lord Chief Baron of Ireland. Through him various noble families are lineally descended from Sir Alexander Napier of Philde and Merchiston. James Lenox Napier of Ireland became Lord Sherbourn. His son married the daughter of Lord Stawel; one of his daughters married Viscount Andover, son and heir of Charles Earl of Suffolk; and another daughter married Prince Bariatiusky of the Russian Empire.—See Note A, as to the English and Irish Napiers cadets of Merchiston.

‡ Elias Ashmole here notes, "At some times, upon great occasions, he had conference with Michael, but very rarely."

briel, Raphael, Uriel, &c. We parted. He instructed many ministers in astrology; would lend them whole cloak-bags of books; protected them from harm and violence by means of his power with the Earl of Bolingbroke He would confess my master Evans knew more than himself in some things; and some time before he died, he got his cousin Sir Richard to set a figure to see when he should die. Being brought to him, 'well,' he said, 'the old man will live this winter, but in the spring he will die; welcome Lord Jesus, thy will be done.' He had many enemies; Cotta, doctor of physick in Northampton, wrote a sharp book of witchcraft, wherein obliquely he bitterly inveighed against the doctor." *

Thus far Sidrophel. But I find Doctor Napier still more curiously recorded by John Aubrey in his quaint volume of Miscellanies, and under the attractive title,

"CONVERSE WITH ANGELS AND SPIRITS."

"Dr Richard Nepeir was a person of great abstinence, innocence, and piety; he spent every day two hours in family prayer. When a patient or querent came to him, he presently went to his closet to pray, and told to admiration the recovery or death of the patient. It appears by his papers, that he did converse with the angel Raphael, who gave him the responses. Elias Ashmole, Esquire, had all his papers, where is contained all his practice for about fifty years, which he, Mr Ashmole, carefully bound up, according to the year of our Lord, in ——— volumes in folio, which are now reposited in the library of the museum in Oxford. Before the responses stands this mark, viz. R. ℞is, which Mr Ashmole said was *Responsum Raphaelis.* In these papers are many excellent medicines or receipts for several diseases that his patients had, and before some of them is the aforesaid mark. Mr Ashmole took the pains to transcribe fairly with his own hand all the receipts. They are about a quire and half of paper in folio, which since his death were bought of his relict by † E. W. Esquire, R. S. S. The angel told him if the patient were curable or incurable. There are also several other queries to the angel as to religion, transubstantiation, &c. which I have forgot. I remember one is, Whether the good spirits or the bad be most in number? *Responsum Raphaelis,* The good. It is to be found there that he told John Prideaux, D. D. anno 1621, that twenty years hence, 1641, he would be a bishop, and he was so, sc. Bishop of Worcester. Raphael did resolve him, that Mr Booth of ——— in Cheshire, should have a son that should inherit three years hence, (sc. Sir George Booth,

* Lilly's Life and Times, p. 123.

† Edward Waller.

Engraved by W.H. Lizars.

Dr RICHARD NAPIER.

FROM THE ORIGINAL IN THE ASHMOLEAN MUSEUM OXFORD.

the first Lord Delamere,) viz. from 1619. Sir George Booth aforesaid was born December 18, anno 1622. This I extracted out of Doctor Nepeir's original diary, then in possession of Mr Ashmole. When E. W., Esquire, was about eight years old, he was troubled with the worms. His grandfather carried him to Doctor Nepeir at Lynford. Mr E. W. peeped in at the closet at the end of the gallery, and saw him upon his knees at prayer. The doctor told Sir Francis, that at fourteen years old his grandson would be freed from that distemper, and he was so. The medicine he prescribed was to drink a little draught of muscadine in the morning. 'Twas about 1625. It is impossible that the prediction of Sir George Booth's birth could be found any other way but by angelical revelation. This Doctor Richard Nepeir was rector of Lynford in Bucks, and did practice physick; but gave most to the poor that he got by it. 'Tis certain he told his own death to a day and hour. He dyed praying upon his knees, being of a very great age, 1634, April the first. He was nearly related to the learned Lord Nepeir, Baron of M..... in Scotland, I have forgot whether his brother. His knees were horny with frequent praying. He left his estate to Sir Richard Nepeir, M. D. of the College of Physicians, London, from whom Mr Ashmole had the doctor's picture now in the museum. He was a good astrologer." *

The Sir Richard Napier last-mentioned was a nephew of Doctor Richard, and younger son of Sir Robert Napier of Luton-Hoe, Bart., the Turkey merchant; consequently, he was first cousin once removed to John Napier of Merchiston. Sir Richard was first of Wadham College, Oxford, and afterwards fellow of All-Souls, and took his degree as doctor of physic. "He was," says Anthony a Wood, "one of the first members of the Royal Society,—a great pretender to virtue and astrology,—made a great noise in the world, yet did little or nothing towards the public. He died in the house of Sir John Lenthall, at Besills-Lee near Ab-

* Miscellanies, &c. Collected by John Aubrey, Esq. F. R. S., *second edit.* p. 169. There is also a curious collection of letters from eminent persons in the seventeenth and eighteenth century, published under Aubrey's name, from the originals in the Bodleian Library and Ashmolean Museum. He was a great friend and source of information to the well-known Anthony a Wood, author of the Athenæ and Fasti Oxoniensis. Wood, in his Life of Judge Jenkins, threw some reflection upon Lord Clarendon, for which he (Wood) was expelled from Oxford; but he afterwards declared that he had it from Mr Aubrey, who had it from Judge Jenkins himself. Anthony used to say of Aubrey, "Look, yonder goes such a one, who can tell such and such stories; and I'le warrant Mr Aubrey will break his neck down stairs rather than miss him."—*Hearne.*

ingdon, in Berks, 17th January 1675, and was buried in the church at Linford, the manor of which did belong to him; but, after his death, his son Thomas sold it for L. 19,500, or thereabouts. The said Sir Richard drew up a book containing a collection of nativities, which is now in MS., in the hands of Elias Ashmole, Esq."* Aubrey gives this curious account of his death:— "When Sir Richard Napeir, M. D. of London, was upon the road coming from Bedfordshire, the chamberlain of the inn shewed him his chamber. The doctor saw a dead man lying upon the bed; he looked more wistly, and saw it was himself! He was then well enough in health. He goes forward in his journey to Mr Steward in Berkshire, and there died. This account I have in a letter from Elias Ashmole, Esq. They were intimate friends."†

Had our philosopher in any degree partaken of the wild absurdities which characterized his cousins in England, the probability is that some traces of a correspondence betwixt them would be found among the papers of Dr Napier at Oxford, which, however, is not the case; and when we compare all that appears of John Napier's fanciful vein, not merely with that of contemporary philosophers, historians, and statesmen, but with the members of his own family, and the cadets of his house, we are led to conclude, that in him astrological and rosicrucian superstitions were subdued in the proportion that his science predominated. When not absorbed in his deep contemplation of the Scriptures, or his purely abstract speculations in mathematics, we shall show that he was better employed than in framing constellated rings for the vulgar, or teaching the Devil to write. But the picture we have now to afford of him deserves to be the subject of a separate chapter.

* Wood's Fasti Oxonienses. *By Bliss.* Part Second, p. 47.

† Miscellanies, p. 91.

CHAPTER VII.

ANOTHER view may be taken of what possibly was the result of our philosopher's contract with Logan, than that he had actually gone to Fastcastle, and been cheated or robbed by its sinister possessor. The Popish Lords, against whom Napier had just been so active and public an instrument, were, after much shuffling on the part of James, again brought before the tribunal of their country. In the month of June 1594, the intercepted blanks and other treasonable papers were produced and verified in Parliament, where a rigorous sentence of forfeiture for high treason passed against the delinquents, with every circumstance of favour to the Protestant cause which had been desired by the Assembly of the Church. The consequence was, that these noblemen were driven to extremities, and they received at this time the accession of the unprincipled Earl of Bothwell, who, like them, could find amid the fast-flowing tide of the king's reformation and justice, no spot to stand on save the most towering treason. They took the field accordingly in great force, with the secret cooperation of Bothwell; and the king sent the young Earl of Argyle to meet them, who sustained the signal defeat at Belrinnes, known by the name of the Battle of Glenlivet, which occurred in October 1594. It was in the intermediate month of July betwixt the forfeiture of the Popish Earls and the date of their victory, that Napier was invited to Fastcastle; and as we see that the Earl of Argyle considered supernatural powers an essential ingredient of his *materiel*, it is not impossible (what idea is too extravagant for the times and the actors *)

* The Latin historian of the battle of Glenlivet, who seems to have been an eye-witness, says, that Argyle's sorceress spread a thick darkness around them, but that all her incantations failed, because, as she herself confessed when taken prisoner, there was something in the Catholic camp

that his enemies considered it advisable to lay a plot to cripple his *corps d'armée*, by the seizure of the marvellous Merchiston. It might also have been intended to bring the laird to a very serious reckoning at Fastcastle on his own account, his host being one more ready to discuss reasons of ransom than of religion. Our philosopher's better genius may have opened his eyes to some such scheme against himself and his party, and thus have prevented his falling into the same snare so soon afterwards spread for the king himself. We see his subsequent indignation against the very name of Logan; and certainly if he went to Fastcastle at this crisis, he must have escaped from it by a miracle. That all eyes were attracted to him at the time, as one able to do more than any other single individual to protect his country from insidious enemies and foreign invasion, is evinced by other of his operations, the history of which is not generally known.

Sir Thomas Urquhart of Cromarty, in a tract which he entitled, "The Discovery of a most Exquisite Jewel, more precious than diamonds inchased in gold," &c. speaks of a Colonel Douglas, who, he says, was very serviceable to the States of Holland, and presented them with a paper, containing "twelve articles and heads of such wonderful feats for the use of the wars both by sea and land, to be performed by him, flowing from the remotest springs of mathematical secrets, and those of natural philosophy, that none of this age saw, nor any of our forefathers ever heard the like, save what out of Cicero, Livy, Plutarch, and other old Greek and Latin writers we have couched, of the admirable inventions made use of by Archimedes in defence of the city of Syracusa, against the continual assaults of the Roman forces both by sea and land, under the conduct of Marcellus." Sir Thomas then introduces his celebrated episode of Napier of Merchiston and Crichton of Elliock, whom he classes together as the Castor and Pollux of Scottish letters. "To speak really," says he, "I think there hath not been any in this age of the Scottish nation, save Neper and Crichtoun, who, for abilities of the mind in matter of practical inventions useful for men of industry, merit to be compared with him: and yet of these two (notwithstanding their precellency in learning) I would be altogether silent (because I made account to mention no other Scottish men here, but such as have been famous for souldiery, and brought up at the school

which impeded all her efforts; "irrito incepto destitit, eo quod, (ut capta dicebat) aliquid in nostris esset castris quod conatus ipsius vehementer impediebat."—*MS. Advocates' Library.* This must have been the genius of the Earl of Bothwell. The wretched woman was put to death.

of Mars) were it not, that, besides their profoundness in literature, they were inriched with military qualifications beyond expression. As for Neper, (otherways designed Lord Marchiston) he is for his logarithmical device so compleatly praised in that preface of the author's, which usher's a trigonometrical book of his, intituled, *The Trissotetras*,* that to add any more thereunto, would but obscure with an empty sound, the clearness of what is already said: therefore I will allow him no share in this discourse, but in so far as concerneth an almost incomprehensible device, which being in the mouths of the most of Scotland, and yet unknown to any that ever was in the world but himself, deserveth very well to be taken notice of in this place; and it is this: he had the skill (as is commonly reported) to frame an engine (for invention not much unlike that of Architas Dove) which, by vertue of some secret springs, inward resorts, with other implements and materials fit for the purpose, inclosed within the bowels thereof, had the power (if proportionable in bulk to the action required of it (for he could have made it of all sizes) to clear a field of four miles circumference, of all the living creatures exceeding a foot of height, that should be found thereon, how near soever they might be to one another; by which means he made it appear, that he was able, with the help of this machine alone, to kill thirty thousand Turks, without the hazard of one Christian. Of this it is said, that (upon a wager) he gave proof upon a large plain in Scotland, to the destruction of a great many herds of cattel, and flocks of sheep, whereof some were distant from other half a mile on all sides, and some a whole mile. To continue the thread of the story, as I have it, I must not forget, that, when he was most earnestly desired by an old acquaint-

* Sir Thomas Urquhart's address to the reader in that strange work entitled *Trissotetras*, &c. occupies two quarto pages, and is from beginning to end a panegyric upon Napier. It commences, "To write of trigonometry, and not make mention of the illustrious Lord Neper of Marchiston, the Inventor of Logarithms, were to be unmindful of Him that is our daily benefactor," &c. He also says most justly, "the philosopher's stone is but trash to this invention, which will always be accounted of more worth to the mathematical world than was the finding out of America to the King of Spain, or the discovery of the nearest way to the East Indies would be to the northerly occidental merchants;" and he concludes by recommending the "imitation of that admirable gentleman, whose immortal fame, in spite of time, will outlast all ages, and look eternity in the face."

Sir Thomas Urquhart was born a few years before Napier died. A complete edition of his works, which may be expected to be well illustrated, is now in the press for the Maitland Club of Scotland. It is a curious genealogical fact, of which this author was not aware, that the respective fathers of his two idols, Napier and Crichton, married (their second wives) about the same time (1571–72) sisters, namely, the daughters of John Mowbray of Barnbougall.

ance, and professed friend of his, even about the time of his contracting that disease whereof he dyed, he would be pleased, for the honour of his family, and his own everlasting memory to posterity, to reveal unto him the manner of the contrivance of so ingenious a mystery; subjoining thereto, for the better perswading of him, that it were a thousand pities, that so excellent an invention should be buried with him in the grave, and that after his decease nothing should be known thereof: his answer was, That for the ruin and overthrow of man, there were too many devices already framed, which if he could make to be fewer, he would with all his might endeavour to do; and that therefore seeing the malice and rancor rooted in the heart of mankind will not suffer them to diminish, by any new conceit of his the number of them should never be increased. Divinely spoken, truly."

The knight of Cromarty's compositions are written in such a strain that it is no easy matter to determine whether he meant to speak truth jestingly, or to tell lies in downright earnest; and we would hardly have ventured to quote this extraordinary story, were it not susceptible of very curious illustration.

Their success at the battle of Glenlivet gave great encouragement to the Popish Lords; but they were unable to cope with the royal banner, and retreated abroad. Philip of Spain, however, still adhered to his lawless projects for the conquest of Britain; and in the year 1595-6, another crisis arrived very similar to that in which Napier was so conspicuous two years before. While Huntly, Angus, and Errol were yet abroad, the news arrived in Scotland in the month of April 1596, that a Spanish army of 25,000 had assaulted and won Calais; and that an English army of 30,000 had entered Spain, and taken signal revenge upon the city of Cadiz. Previous to this the greatest excitement prevailed in Scotland from the terror of a Catholic invasion, and *Wappin-schaws*, for the universal practice of arms, were everywhere assembled by the express orders of government. That Napier, at least since the detection of the Spanish plot, had deeply occupied himself in the construction of unknown instruments of war for the protection of his country, is proved by the *scantlings* or summary of his inventions, which at that time he had drawn up, and which appears also to have been presented to the English government by some of James' ambassadors, who were sent with offers of co-operation to all Christian kings against the enemies of the Gospel. In the "Historie of James the Sext," it is narrated, that "in the end of this yeir, (1595) the king being informit

that the Turc was entrit Christendome with a potent armie, and his majestie having favour to the Christien cause and glorie of Chryst, thought expedient to direct a condigne messinger unto the emperor, and that was William Stewart, Lord of Pittinweme, and knycht of Houston,* with letters, declaring that his majestie was glad to understand his forwartnes in that gude cause, and tharefore he promeist to mak sik assistance as he could in that purpose, to debell the great ennemie to our Salviour Chryst," &c. Now, there is yet preserved in the Bacon Collection in Lambeth Palace the following document, of which, through the liberality of its noble possessor, I am also enabled to present the reader with a fac-simile.

" Anno Domini 1596, the 7 of June, Secrett Inventionis, proffitabill and necessary in theis dayes for defence of this Iland, and withstanding of strangers, enemies of God's truth and religion.

" FIRST, the invention, proofe and perfect demonstration, geometricall and alegebricall, of a burning mirrour, which, receving the dispersed beames of the sonne, doth reflex the same beames alltogether united and concurring priselie [precisely] in one mathematicall point, in the which point most necessarelie it ingendreth fire, with an evident demonstration of their error who affirmeth this to be made a parabolik section.

" The use of this invention serveth for burning of the enemies shipps at whatsoever appointed distance.

" SECONDLIE, The invention and sure demonstration of another mirrour which receiving the dispersed beames of any materiall fier or flame yealdeth allsoe the former effect, and serveth for the like use.

" THIRDLIE, The invention and visible demonstration of a piece of artillery, which, shott, passeth not linallie through the enemie, destroying onlie those that stand on the randon thereof, and fra them forth flying idly, as utheris do; but passeth superficially, ranging abrode within the whole appointed place, and not departing furth of the place till it hath executed his whole strength, by destroying those that be within the boundes of the said place.

" The use hereof not onlie serveth greatlie against the armie of the enemy on

* P. 354. This was Colonel Stewart, commendator of Pittenweem, and captain of the king's guard. His son was created Lord Pittenweem, in whom the title became extinct. In the old chronicle quoted, the date of this mission is stated loosely as occurring at the end of 1595, and that he returned in December following.

land, but alsoe by sea it serveth to destroy, and cut downe, and one shott the whole mastes and tackling of so many shippes as be within the appointed boundes, as well abried as in large, so long as any strength at all remayneth.

" FOURTHLIE, The invention of a round chariot of mettle made of the proofe of dooble muskett, which motion shall be by those that be within the same, more easie, more light, and more spedie by much then so manie armed men would be otherwayes.

" The use hereof as well, in moving, serveth to breake the array of the enemies battle and to make passage, as also in staying and abiding within the enemies battle, it serveth to destroy the environed enemy by continuall charge and shott of harquebush through small hoalles ; the enemie in the meanetime being abased and altogether uncertaine what defence or pursuit to use against a moving mouth of mettle.

" These inventiones, besides devises of sayling under the water, with divers other devises and stratagemes for harming of the enemyes, by the grace of God and worke of expert craftesmen I hope to perform.

" JO. NEPER, *Fear of Marchistoun.*

This paper is indorsed " Mr Steward, secretes inventiones de la guerre le mois de Juillet, 1596." *

M. Biot, as an apology for the celibacy of Sir Isaac Newton, remarks, that when we consider how his time was occupied, we may easily conceive that he was never married. But we thus see that our philosopher who by this time was married to a second wife, and had six sons and six daughters, was just as completely and profoundly occupied with theology, science and the state of the country, as any human being could possibly be. Upon looking at the indorsation of this paper, it appears to have been received from some one of the

* This very curious paper is little known, and no perfect copy of it has been hitherto printed. It appeared, but without any illustration, in Dr Anderson's collection of fugitive pieces, entitled " The Bee ;" in the month of June, 1791 : but that copy is imperfect both in the contents and in the signature. It was reprinted with these errors in the year 1804, in the 18th volume of Tilloch's Philosophical Magazine, where some of the inventions are illustrated with scientific research. The illustration, however, considered scientifically, is by no means complete ; but serves to show how much might be made of a review of Napier's scantlings if thoroughly digested by a philosopher. Lord Buchan in his life of Napier, merely refers to the title of this paper, and calls it a " letter to Anthony Bacon ;" which shows he had not considered it. He refers his reader to his appendix for the document, where, however, it is not to be found.

[Harrison's Chronicle Holinshed Library Vol. I. fo. 38. verso.]

Anno Dñi 1586 the 1st of June

by cõtinuall Rayne & Rott of Gargantuas strange mall
spalle. The Enemie in ye meane time hauing abroad & altogether
Incrochaine regal cõfonce & prosperite to vse against a moning
mouse of mettle.

The Inuentions behinde Dunbar of Sayling bridge ye water
wh dryes afore Dunbar & Stratagems for Farming of ye ordnyes
by ye grace of God & worke of seuer[all] wrights mr Hopo to prouide
to repaire from of Haerigtons

Mr Steward
Secretes muentions de la gue
rre le mois de Juillet 1586

name of Steward, a month after its date; and there seems reason to surmise that this was the ambassador of James VI., who had taken an opportunity, (during his mission to "debell the great Turc,") of presenting the result of the Scotch philosopher's scientific ingenuity to the English government, which was then very much excited against the Catholic enemy. England herself was threatened, and, accordingly, Napier frames his proposals in reference to the whole island.

It was obviously not from this paper that Sir Thomas Urquhart obtained a knowledge of the machine he describes as having been put to a practical test in Scotland; in that case he would have noticed the other inventions, and also the coincidence of Napier having offered to his countrymen a written summary, or succinct description of more than one of the very schemes which Colonel Douglas presented to the states of Holland. We must therefore hold, that the knight of Cromarty is corroborated in his story by Napier himself, whose description of the third invention contained in his paper seems to agree precisely with that said to have been tried on a large plain in Scotland. Whether the experiment actually took place, or with the effect alleged, is, however, not of much consequence. Napier was as far removed as possible from the character of a quack, or empiric, in any branch of science to which he directed his powerful mind; and we may safely take it upon his own declaration, that he had mastered, so far as he was concerned, all the machinery he describes. Neither is it necessary for his reputation in the matter that these inventions should be capable of the practical application which their author anticipated. That they are not so, or at least that their utility is superseded by a more intellectual art of war, may indeed be taken for granted. But the question is, what evidence do they afford of Napier's inventive powers when compared with the scientific resources of his day, and the scientific experiments of subsequent philosophers who illustrate more enlightened times? To answer this question properly, would require a profound acquaintance with science. If by laying the document itself in this authentic form before the public, a philosopher should be attracted to bestow upon it the illustration it merits, we shall have performed all that we can hope to do. There are, however, some readers who may be apt to regard with contempt these "scantlings of inventions,"* as the shadows of a fanciful mind, or at best only worthy

* In the year 1663, Edward Marquis of Worcester published what he entitled, "A Century

of being classed with those visionary experiments of which we have an instance in the Italian alchemist who broke his bones in an attempt to fly. In the only scientific notice hitherto bestowed upon them, there is, from the nature of the publication which contains that notice, no attempt to trace the history of their origin in Napier's mind, or to connect them with the state of the country and his own career. The reader of the Philosophical Magazine is at once confronted with the Inventor of Logarithms, in a position which, notwithstanding the scientific analysis, gives him, in that abstract consideration, something of the air of an over-excited philosopher, exercising a fine mathematical genius within and upon the walls of a mad-house. But, having followed the progress of his mind, amid every collateral circumstance likely to influence it, from his birth in the dawn of the Reformation, through his youthful studies so abhorrent of popery, to the maturer exertion of his faculties in the cause of God's truth,—and then in its prominent part, even against those connected to him by the strongest ties, down to this year 1595-6, when the greatest excitement prevailed in the country from the expected Spanish invasion,—the disagreeable effect of this luminous, but apparently isolated spot, vanishes in the natural union of the broad lights and shadows of his life, and we find the picture of a philosopher.

Some remarkable coincidences, betwixt the mental structures of Napier and Newton, have been already noticed. The remnant we are now considering will have suggested another very interesting parallel, viz. betwixt Napier and Archimedes,—the Newton of the schools of Greece. We may turn for a

of the names and scantlings of such Inventions as at present I can call to mind to have tried and perfected, which (my former notes being lost) I have, at the instance of a powerful friend, endeavoured now, in the year 1655, to set these down in such a way as may sufficiently instruct me to put any of them in practice." A few of these are very analogous to Napier's; but, with some brilliant exceptions, they are characterized rather by trick and plagiarism, than science and originality. The following encomium may nevertheless be just: " Here it may not be amiss to recommend to the attention of every mechanic the little work entitled, a ' Century of Inventions,' by the Marquis of Worcester, which, on account of the seeming improbability of discovering many things mentioned therein, has been too much neglected; but when it is considered that some of the contrivances, apparently not the least abstruse, have by close application been found to answer all that the Marquis says of them, and that the first hint of that most powerful machine, the steam engine, is given in that work, it is unnecessary to enlarge on the utility of it."—*Trans. of the Society of Arts*, Vol. iii. p. 6.

moment to the early epochs of philosophy, introduced to us by the revival of letters, when the mathematical stores of those illustrious schools were gradually unfolded by men worthy of that exciting task. "In nothing, perhaps," said one who deeply felt what he eulogized, "is the inventive and elegant genius of the Greeks better exemplified than in their geometry. The elementary truths of that science were connected by Euclid into one great chain, beginning from the axioms, and extending to the properties of the five regular solids, the whole digested into such clearness and precision, that no similar work of superior excellence has appeared, even in the present advanced state of mathematical science." * Plato himself was one of the most expert geometricians of his time; and how he regarded the science may be gathered from his reply to the question, In what manner Omnipotence is occupied? "With geometry through all eternity," said the philosopher, in allusion to the geometrical laws which pervade the physical universe. This was indeed a lofty conception and magnificent picture of the mixed mathematics, of which Socrates, too, offered a profound and practical view, even while he inculcated the propriety of its limitation, in mortal hands, to mortal necessities: "When we know," said he, "enough of geometry to measure our fields, enough of astronomy to measure our time, and to guide us by sea and land, we ought to affect no higher knowledge." But, if we are to search for the most illustrious instances of speculative and applicate science which the annals of the ancient world afford, we must study the works of Archimedes. He was born at Syracuse about 287 years before the Christian era; and his success in the higher geometry, independently of other mathematical attainments, is even now the wonder and admiration of an age of algebra. Geometry and mechanics were the regions in which his genius delighted to expand; but so deeply was he imbued with the spirit of the pure and profound speculations of the former, that he seems to have disregarded, and is said in some measure to have disdained, his own most ingenious and effective mechanical inventions. Far in advance of his species, he carried his investigations on the most daring and determined wing of intellectual adventure, beyond the boundaries of elementary geometry, to the most recondite fields of the higher curves, and the originality and fertility of his mind were manifested, not only by the most eminent success in these difficult and unexplored departments, but by the germ which his methods of philosophizing disclosed of some

* Professor Playfair's Dissertation on the Progress of Mathematical and Physical Science.

of those subtile resources which constitute the power and the glory of the new geometry. His unwearied application to the properties of curves elicited the celebrated method of exhaustions, the most triumphant monument of his speculative genius, and one which bears much the same relation to the ancient geometry that the infinitesimal analysis does to the new. In the science of numbers, too, he was deeply versed; and the sands of the sea afforded a numerical subject commensurate with the magnitude of his mind. His well-known work, *De Numero Arenæ*, refutes, by a beautiful application of a logistic peculiar to himself, the plausible but crude proposition, that no mortal power of numbers would suffice to express the quantity of the grains of sand on the shores of the ocean. It was in this treatise that he evinced a knowledge of that quantitative property lurking in the proportions betwixt arithmetical and geometrical progressions, which is the germ or fundamental principle of LOGARITHMS. With the aid of this, he supplied the deficiency of the arithmetical notation of the Greeks to express numbers unusually great; but the glory was left for Napier to elicit from that numerical speculation a beam of light, still travelling with unchecked career in boundless space. To the *Arenarius* of Archimedes, therefore, we must recur in another chapter.

With what finer genius of antiquity than him so justly called " a man of stupendous sagacity, who laid the foundation of almost every discovery whose extension constitutes the triumph of our own age," * could we compare the old Scottish baron, and how fearlessly may we do so! Though the schools of Greece be hallowed by such names as Euclid and Archimedes, and the last age of a brilliant but false philosophy, which succeeded the restoration of letters, saw the rise of Kepler and Galileo; still it may safely be said, that before the dawn of the Baconian era in Britain,—an era which Newton consummated, but to which Napier brought the *first* irresistible impulse,—the history of the mixed mathematics is comparatively barren. We find, it is true, from the earliest times, rich treasures of speculative, and illustrious instances of practical genius; but where were the achievements of the new geometry, the celestial wing of physical astronomy, the fearless paths of navigation! These accumulated triumphs are all crowded within the last two centuries, and belong to an island which in the preceding ages was a prey to savage turbulence, and seemed never destined to overtake, far less to outstrip the conti-

* " Vir stupendæ sagacitalis qui prima fundamenta posuit inventionum ferè omnium in quibus promovendis ætas nostra gloriatur."—*Wallis.*

nent in its immortal career of science and letters. In the conquests of the seventeenth century the Scotch philosopher stands first; and we shall have to show that he was pre-eminently successful at the very point where the sage of Syracuse failed. But it will be no mean preliminary, if we can discover indications that Napier, on the other hand, could bend the bow of Archimedes.

It is alleged that the Grecian philosopher considered the sublimity of abstract thought as debased by material contact; but he did not act upon that selfish and mystical idea. No man, according to Livy and Plutarch, ever worked such wonders in and by means of mechanical science, as he did. "Give me another spot for my foot, and I will displace the earth,"* was an expression scarcely hyperbolical in the mouth of a philosopher, whose achievements in statics rendered aghast the military experience of Rome. When the states of Sicily revolted, and joined the Carthaginians against the Commonwealth, Claudius Marcellus sat down before the rich city of Syracuse, which was expected to fall an easy prey to the vigour of the Roman arms. "And so it would," says Livy, "but for one man in Syracuse; this was Archimedes, an unrivalled astronomer, but yet more admirable for the invention and management of missile engines and other warlike contrivances, by which, with perfect ease, he rendered futile the most laborious operations of the enemy. The wall of Syracuse, which was carried along the unequal surface of ridges, and thus in some places inaccessible, and in others almost so level as to afford an open path, he crowned with every species of engine, each adapted to the nature of its position. Marcellus placed his first class of ships against the fortification Achradina, whose bulwarks are washed by the sea; while with his archers, slingers and skirmishers, whose weapon it requires great skill to throw back again, he so plied the walls that nothing could live upon them. These, however, kept at some distance, in the smaller vessels, to afford room for their missiles. The other vessels were so disposed in pairs, closely wedged together by removing the banks of oars in the inside, as to be worked at one and the same time by the outside oars, and these sustained towers protected by a cover of planks, and other machines for shaking the walls. Against this armament Archimedes disposed machines of various

* "This," says Tzetzes, "he uttered in his own Syracusian Doric;" and then he gives the expressions thus,

Πᾶ ϛῶ, και Χαρίσιωι τὰν γᾶν κινήσω παισαν;

magnitudes upon the walls. At the distant ships he cast rocks of a tremendous size, and those under the walls he pelted with lighter stones, of which, consequently, the showers were more frequently repeated; and, besides all this, he hit upon a contrivance to annoy the enemy secretely and safely, by piercing the whole surface of the walls with loop-holes a cubit in length, through which the archers, and those who worked the light scorpions, darted their missiles," &c. *

The Roman historian proceeds to describe other machines of tremendous power, but enough has been quoted to display the analogy betwixt the proposals of Napier and what was actually effected by the patriotic science of Archimedes, according to the accounts of Livy and Plutarch. But these historians have said nothing of the celebrated burning mirrors which form so conspicuous a part of the philosopher's exploit upon that occasion; and it is obvious that Napier must have found elsewhere the prototype of his catoptric instruments which form his two leading propositions. Zonaras and Tzetzes, Byzantine authors, notice particularly the fact, that Archimedes destroyed the fleet of Marcellus by reflecting the sun's rays upon it from a mirror, or mirrors of a particular construction. Tzetzes refers to a variety of authorities, and among the rest to Dion Cassius, and Diodorus Siculus; but the passages he quotes have been lost, and we must now take the authority of those ancient authors upon that of the more modern. He also refers particularly to the *Paradoxa Machinamenta* of Anthemius of Tralles, the celebrated architect and philosopher patronized by Justinian. A fragment of this Greek work is still preserved, in which the catoptric feat of Archimedes is much enlarged upon, and a theory of its execution given *con amore;* but we cannot suppose that Napier derived any hint or assistance from this, which was only given to the world in the last century by the elaborate version of M. Dupuy.† It was most probably through Tzetzes that our own philosopher became acquainted with the fact, that the fleet of Marcellus was so destroyed at Syracuse; and unless we are to adopt the supposition, that, by a most extraordinary coincidence, he hit upon the very schemes of Archimedes, and for the same patriotic purpose, without having studied his history or looking to him as a prototype, it is obvious that Napier had caught fire, to use an appropriate image, even at the feeble reflection which

* *Livii Histor.* Lib. xxiv. c. 34. Ruddiman's edit. T. ii. p. 347. Plutarch, *in Marcello.*

† Traduction du fragment d'Anthemius, sur des Paradoxes de Mechanique.—*L'Academie des Inscriptions,* T. xlii. p. 401.

Tzetzes affords, and actually succeeded in discovering the power which Archimedes wielded. The fact itself, that in those rude and unlettered days of Scotland, he could relish and emulate the triumphs of Archimedes, presents a remarkable picture of his mind, of which the interest is not a little heightened when we reflect, that, like the hero of Syracuse, it was for his country's salvation he laboured; and that, in adopting so noble an example, he must have felt himself ready to become her most prominent protector in the worst extremity.

To what extent the proposals, which he then submitted to his country and to England, indicate the mental power which eighteen years afterwards gave the logarithms to the world, is a question which we can only expect to illustrate in such a manner as may interest those to whom a popular view of the facts may be more agreeable than a profound exposition of the science.

It is obvious that, in the *precis* of his inventions, Napier intended to conceal rather than display the particular mode of his catoptrics, and the principles of the mechanism he had conceived. This mystery was the fashion of his day, and we find that even in the greatest of his speculations, while benefiting the world by the result, he reserved to himself the secret construction of his canon, until the learned should inform him how they relished the invention.* But there can be no question, when we attend to that combination of power and unaffected simplicity which were the leading features of his mind, and which are so deeply impressed upon everything it produced, † that he had fully satisfied himself as to the inventions he thus vaguely intimated, that for years he had been occupied with the subject, and was now prepared, not merely with the *mathematical* demonstrations, but also with the practical proof, and *visible* demonstration of one and all of these warlike instruments, of which he ex-

* "Promissum itaque mirificum Logarithmorum canonem habetis, ejusque amplissimum usum; quæ si vobis eruditioribus grata fore ex rescriptis vestris intellexero, animus mihi addetur, ad tabulæ condendæ methodum in lucem etiam proferendam."—*Canonis Descriptio*, Lib. ii. C. vi.

† Speaking of Napier's great work, Professor Playfair observes, "At a period when the nature of series, and when every other resource of which he could avail himself were so little known, his success argues a depth and originality of thought which, I am persuaded, have rarely been surpassed." Certainly no man was less indebted to extrinsic resources in every thing he undertook, than Napier. The first treatise extant on catoptrics is that attributed to Euclid; and which was only first published in Latin in 1604 by John Pena. Alhazen, the Arabian, composed a volume of optics about the year 1100, in which catoptrics are treated of. Vitello, a Polish writer, composed another about the year 1270. Most probably Napier never saw these works.

pressly claims to himself *the invention*. We may suppose that it was to these, among other projects of his fertile genius, that he so solemnly refers in his letter to James VI. in 1593; "for let not your majesty doubt, but that there are within your realm (as well as in other countries) godly and good ingynes, versed and exercised in all manner of honest science, and godly discipline, who by your majesty's instigation might yield forth works and fruits worthy of memory, which otherwise, lacking some mighty Mæcenas to encourage them, may perchance be buried with eternal silence." And we may, perhaps, in this sentence trace an allusion to a work of his day which must have created some sensation in England. Leonard Digges, the grandfather of Sir Dudley, was an able mathematician, born in the county of Kent about the commencement of the sixteenth century. Exceedingly ingenious, and indefatigable in his attempts to apply the secrets of science to practical purposes, he published various works of the kind betwixt the years 1555 and 1570, when he died suddenly. One of his most curious works he left unpublished. This was a geometrical treatise, entitled Pantometria, containing many rules for mensuration, particularly in the art of war, towards which his practical applications generally turned. His son, Thomas Digges, published this work in the year 1571, and dedicated it to the Lord-Keeper, Sir Nicholace Bacon, among the papers of whose son, Anthony Bacon, Napier's scantlings of inventions are found. In the twenty-first chapter of the first book of Digges' Pantometria occurs the following passage:—"But of these conclusions I mind not here more to entreate, having at large, in a volume by itself, opened the miraculous effects of perspective glasses; and that not onely in matters of discoverie, but also by the sunne beames to fire powder or any other combustible mater, which Archimedes is recorded to have done at Syracuse in Sicilie when the Roman navie approached the town. Some have fondly surmised he did it with a portion of a section parabolicall, artificiallye made to reflect and unite the sunne beames a great distance off; and for the construction of this glasse, take great paines, with high curiosity, to unite large and many intricate demonstrations; but it is a mere fantasie, and utterlie impossible with any one glasse, whatsoever it be, to fire any thing onely one thousand pace off, no, though it were a hundred foote over. Marry true it is, the parabola for his small distance most perfectly doth unite beames, and most vehemently burneth of all other reflecting glasses. But how, by application of mo glasses, to extend this unitie or concourse of beames in his full force, yea to augment and multiplie the same that the farder it is carried the more violently it shall pearse and burne, *hoc opus, hic labor est*, wherein, God sparing life, and the

time with opportunitie serving, I minde to imparte with my countriemen some such secrets, as hath, I suppose, in this our age beene revealed to very few; no lesse serving for the securitie and defence of our naturall countrey than surely to be mervailed at of strangers." Thomas Digges, the editor of his father's work, mentions, in his dedication to the Lord Keeper, that the author had intended to present it to Sir Nicholas, but was prevented by death; and he also declares in his address to the reader, that his father "hath also sundrie times, by the sunne beames, fired powder and discharged ordinance half a-mile and more distante; which things I am the boulder to report, for that there are yet living diverse, of these his dooings, *oculati testes*," &c.* It is not improbable that Napier may have seen, or at least have been informed of the contents of this work, and that his own attempt to solve the important problem of Archimedes may have derived an impulse from the alleged success of the English mathematician; but by the year 1596 both Leonard and Thomas Digges were dead, and the catoptric secret of the former had not been disclosed.

The coincidence, however, serves to explain an expression in Napier's leading proposition, which may be thought obscure and startling. He professes to be able to demonstrate "their error who affirmeth this to be made a parabolic section." To those not acquainted with mathematics and optics, this would convey no meaning whatever; while to those who are, it might, on a hasty consideration, seem to involve a blunder in catoptrics or the science of reflected light.† It is difficult to give a distinct illustration of this matter, unless the reader have some knowledge of the geometry of curves, as well as of catoptrics, both of which are involved in the expressions to be considered. A cone may be cut through in a variety of directions, so that the outline of the cut surfaces will present a corresponding variety of mathematical figures. Some of these will be the circle and triangle, the well known figures of ordinary

* Sir David Brewster (Edinburgh Encyclopædia, *Burning Instruments*,) has mentioned this work as published by the author himself, and that his son merely republished it in a second edition. But Thomas Digges says in his dedication, "perusing also of late certaine volumes that he (Leonard) in his youthe time, long sithens had compiled in the English tongue, among others I found this geometricall practise which my father, if God had spared him life, minded to have presented your honor withall; but untimely death preventing his determination, I thought it my part to accomplish the same," &c. There are two editions of the work, 1571 and 1591.

† I know from experience that scientific men are apt to consider this sentence as containing a hasty and erroneous proposition.

geometry; other sections, however, produce different curves, namely, the ellipsis, hyperbola, and parabola. The parabola is obtained by cutting the cone obliquely through one of its sides and the base, but always in a direction parallel to the opposite side of the cone from that which is cut. This curve, passing through the base, is obviously not complete in itself, and one of its characteristics or properties is, that it has no tendency to complete a figure, like the ellipsis or the circle, by meeting or relapsing in a continuous line. A perpendicular line passing through the vertex of a parabola so as to divide it into two equal and similar parts is termed its *axis;* and within this axis is a point whose situation is geometrically ascertained, and which is termed the *focus.* The principles of conic sections are beautifully combined with optics in evolving the properties of burning mirrors, and the best form of their construction. If the polished surface of a mirror be concave and *spherical,* it is a well known property, which can be geometrically demonstrated, that a ray of light falling upon it near and parallel to the axis, will be reflected at a distance from the mirror nearly equal to half the radius; this is the focus, where the condensation of the rays into a small space will be apt to produce combustion. But it can be also geometrically demonstrated, that, in order to make the rays concur precisely in their reflection upon one focal point, it is necessary to give the concave surface of the mirror a *parabolic* curve, the property of which is, that every ray parallel to the axis of this parabola will be reflected precisely upon that point. Hence, if rays from the sun, or any radiating point so distant that the rays may be considered parallel to one another, fall upon the concave surface of a parabolic mirror, they will all be reflected into its focus.

Now, a hasty view of Napier's proposition might lead us to infer that he meant to contradict what he considered a mistake in the catoptrics of his day, namely, that a parabolic speculum reflects the solar rays to the focus, as the burning point. But the mathematical investigation demonstrative of the truth of that proposition, is also sufficient to assure us that one so thoroughly master of geometrical laws as our philosopher could never have fallen into such an error. We must understand, therefore, his proposition in another sense; and the passage quoted from the Pantometria of Leonard Digges may assist us to the true meaning of Napier's expressions. It appears, that, relying upon this known property of a parabolic speculum, various attempts had been made to construct a mirror of the sort, which would produce the astonishing effect of com-

bustion at a distance far beyond the ordinary reach of any parabolic focus. Digges declared that it was a "fantasie and utterly impossible" to construct a mirror of the requisite dimensions for such a purpose, "marry, true it is, the parabola for his small distance most perfectly doth unite beames, and most vehemently burneth of all other reflecting glasses:" What is this but the language of Napier, who, in proposing to burn the enemie's ships "at whatsoever appointed distance" also offers a demonstration of their error who affirm that this is to be done by means of constructing a mirror whose curve shall be a parabolic section; and the language of Montucla, in the eighteenth century, is precisely to the same effect; "Il ne faut qu'une légère théorie de catoprique pour appercevoir qu' Archimède ne put produire cet effet par un seul miroir de courbure continue, soit sphérique, soit parabolique. La distance à laquelle devoient être les vaisseaux romains, n'eussent-ils été qu'un peu au-delà de la portée du trait, ou même plus près, auroit exigé une portion de sphére d'une prodigieuse grandeur; car le foyer d'un miroir sphérique est au quart du diamètre de la sphère dont-il fait partie. Il n'y auroit pas moins d'inconveniens dans un miroir parabolique: en vain proposeroit-on avec quelques-uns une combinaison de miroirs paraboliques, à l'aide de laquelle ils ont prétendu produire un foyer continu dans l'étendue d'une ligne d'une grande longueur; ce n'est-là qu' une idée mal réfléchie, et dont l'exécution est impracticable par bien des raisons."* It was in consequence of such vain attempts, founded, however, upon a law of catoptrics undeniable in the abstract, that the exploit of Archimedes began to be looked upon as a fable; an idea which, notwithstanding all the historical and scientific evidence in support of it, is even yet more or less entertained. If Napier, therefore, was conscious of having discovered the true secret, it was natural, that, to the announcement of that fact, he should add a proposed refutation of the practical error which had brought the attempt into disrepute. Scientific men might possibly take more profound views of his meaning, and discover some more original idea in his proposal, than that he meant merely to demonstrate the limited range of a practical parabolic focus. The parallelism of the solar rays seems to be a postulate in arriving at the results of that form of speculum; and if we may suppose that Napier intended to change the direction of the solar rays from parallelism, and afterwards to bring them to a burning focus, certainly the parabolic figure would not have answered his purpose.

* Hist. des Mathémat. T. i. p. 232.

We shall not, however, presume to argue so refined a hypothesis, by which, in unskilful hands, our philosopher might haply be landed in a quirk, or even in a blunder worse than that alleged against him. That he had not fallen into the mistake of denying the simple and well-established proposition, that a parabolic speculum reflects the solar rays to a burning point which is the focus of the parabola, will be readily admitted by every man of science who compares the nature of that proposition with the genius of Napier; and we cannot help thinking, that his true meaning is just as we have attempted to illustrate it by the corresponding passages from Leonard Digges and Montucla.

Napier flourished in a rude and credulous age, from whose hallucinations the loftiest intellects were by no means exempt. As the wonders of natural magic became gradually developed, it is not surprising that the most extravagant hopes should have been formed of its practical application; and that the beautiful phenomena, which could be actually demonstrated, were for a time mingled with the wildest theories, and the merest impossibilities. It was the age when theories were in their most gigantic growth, and philosophical experiments in the feeblest stage of infancy. But it would be exceedingly rash to class the catoptric propositions of our philosopher with such day-dreams, or even with his own astrological or rosicrucian propensities. Their value, as an evidence of his capabilities in profound and practical geometry, will be best seen by glancing at the history of such speculations since his own times.

He probably soon became aware, that these scientific instruments were not likely to be of any service to the art of war, whose practical improvements really depend upon a combination of the greatest power with the most perfect simplicity and readiness of action. Consequently, his schemes shared the fate of those which Archimedes was so fortunate as, upon one occasion, actually to perform,—they were cast aside, and fell into oblivion. There was still, however, among men of science, a hankering after the experiment, the principles of which fell continually under consideration during the progress of optics. But, confined as these considerations generally were to the laws of ordinary reflection, the disciples of light, fascinated by their parabolic focus, kept gazing at that, and marvelling how a ship could get there, until they began to sneer at the immortal Archimedes and those who believed in him. At length the great DESCARTES arose, whose word was a law. The publication of his Dioptrics in 1637, established an era in the science of light.

His investigation of the laws of *refraction* was, in one problem at least, eminently successful. Distinguished, however, for the truth and beauty of the geometrical demonstration, rather than for practicability, even the celebrated *ovals* of Descartes, (or those conic sections which he discovered to be the only form of a *lens* capable of concentrating incident rays to one focal point,) from the difficulties attending their construction, have also fallen into oblivion. But in the same work, that great man hazarded a very defective dictum on the subject of the catoptrics of Archimedes. "A burning mirror," says he, "whose diameter is not much more than a hundredth part of the distance betwixt it and the spot where the burning point ought to fall,—that is to say, whose diameter is in the same ratio to that distance as the diameter of the sun is to the distance betwixt it and us, though it were polished by the hand of an angel, would bring no more heat to the spot where it most powerfully concentrated the rays, than what would arise from the direct rays of the sun without the aid of such reflection; and this may be esteemed nearly equally true in the same proportion of burning glasses. Hence it is obvious, that, from a crude conception of optics, impossibilities have been imagined; and that those famous burning mirrors of Archimedes, by which he is said to have consumed a fleet in the distance, must either have been mighty big, or, what is more probable, are a fabulous creation." *

If, as is possible, Descartes in this passage meant chiefly to deride their exertions who, assuming that Archimedes owed his success to the focal properties of *concave* mirrors, toiled to construct the most perfect for that purpose, so far he only maintained that refutation which Napier proposed half a century before him. † But in limiting his remarks with the sceptical expressions

* "Et speculum comburens, cujus diameter non multo major est centesima circiter parte distantiæ quæ inter illum et locum in quo radios solis colligere debet; id est, cujus eadem sit ratio ad hanc distantiam, quæ diametri solis ad eam quæ inter nos et solem, licet angeli manu expoliatur, non magis calefaciet illum locum in quo radios quàm maximè colliget, quàm illi radii qui, ex nullo speculo reflexi, directè ex sole manant. Atque hoc etiam, ferè eodem modo, de vitris comburentibus intelligi debet. Unde patet, eos qui non consummatam optices cognitionem habent, multa fingere quæ fieri non possunt; et specula illa famosa quibus Archimedes navigia procul incendisse fertur, vel admodum magna fuisse, vel potius fabulosa esse."—*Renati Descartes, Dioptrices*, c. viii. § xxii.

† M. Dupuy, in his Commentary upon the Fragment of D'Anthemius, observes, in reference to the dictum of Descartes, "Si Descartes n'a jamais parlé des *miroirs plans*, s'il n'a même pas soupçonné la manière de les disposer pour porter l'incendie au loin, il est clair que ce n'est pas à cet égard qu'il a traité de fabuleux les miroirs dont on attribuoit l'usage au Géomètre de Syra-

as to the exploit of Archimedes, Descartes betrays the fact, that profoundly versed as he was in optics, he had not discovered, what Napier had, namely, some other mode of operation, independent altogether of parabolic mirrors, which would afford the result required.

At length, however, *Athanasius Kircher*, a man of an imaginative but most original and ingenious turn, laid a substantial foundation for refuting those who denied the possibility of the fact. In a work of his published nine years after the Cartesian Dioptrics, and entitled, "Ars Magna Lucis et Umbræ," he proposes this question, "Whether the mirrors of Archimedes and Proclus could set fire to ships at the distance described by some authors?" He then reviews the ancient historians who have recorded the facts, and prefers the account of the Byzantine chronicler, Tzetzes, who calls the distance a bow-shot; he also narrates, that, not satisfied with such vague statements of that important part of the problem, he went in person to Syracuse, examined minutely and critically that part of the walls anciently called Achradina, under which Marcellus placed his ships, and satisfied himself that the distance with which the philosopher had to contend was not more than thirty paces. Under these circumstances, Kircher seems to have considered it possible, that Archimedes may have had a concave mirror of such magnitude as to project a focus upon the ships; and that these might have been so steady under the walls, as to afford an opportunity of applying that focus with effect. "Nay," says he, "I admit that a mirror whose parabola would embrace a mountain, would throw a focus to a corresponding distance. But where is the man to construct a mirror of that portentous magnitude? I myself, toiling to get to the bottom of this matter, have gone a pilgrimage through Germany, France, and Italy, to discover a parabolic speculum, the focus of which would reach the distance of twenty or thirty paces, and have found it not, even among the most cunning artificers." He mentions, however, that his friend *Manfredus Septalius* actually succeeded in constructing one which burned at the distance of fifteen paces; but the result of his researches and labours is the conviction, that human industry was unequal to construct a parabolic mirror with a focus beyond thirty paces. Kircher then betook himself to experiments with plain mirrors,

cuse. Il en vouloit seulement à ce *demi Savans* en Optique, comme il s'exprime, qui soutenoient qu'avec des miroirs *concaves* Archimède avoit brûlé des navires de fort loin; d'où il concludit avec raison que ces miroirs devoient etre extrêmement grands, ou plutôt qu'ils sont fabuleux."—*L'Academie des Inscriptions*, T. xlii. p. 449.

and professes to have solved the problem, "How to construct a machine, composed of plain mirrors, capable of causing combustion at the distance of one hundred feet, or even further off." The extent to which he carried his practical solution he declares to be this:—Having ascertained that a mirror of an ordinary size would illuminate a spot in the plain before it, diminished in the ratio of one-fourth to the reflecting mirror, and this a hundred feet off, he tried the experiment with a single mirror. This he found afforded a heat not equal to the direct heat of the sun; doubling the reflection, by means of a second mirror directed upon the same spot, he perceived a remarkable increase of heat; a third mirror produced the heat of a fire; under the influence of a quadruple reflection, the heat was still bearable; but, upon the application of a fifth mirror, the heat was scarcely to be endured. Satisfied with these unequivocal results, Kircher proceeds no further, but recommends the extension of his experiment to future philosophers. *

M. Dupuy, as an apology for the scepticism of Descartes, refers to the fact, that Kircher's experiment was instituted nine years subsequent to the dioptrics of the former; "and what geometrician," he exclaims, "before the time of Descartes, had ever dreamt that Archimedes might have operated by plain mirrors? Kircher's experiment is in truth the first of the kind since the days of Anthemius." But, however limited Napier might have been in his practical resources, we owe it to his genius, and the boon he has bestowed upon mankind, to admit, when we read the summary of his inventions, that at all events through his abstract mathematical powers, he had arrived at the very result to which Kircher's unwearied journeyings and practical labours had conducted him. It is even possible that he had instituted the experiment, as, indeed, Sir Thomas Urquhart's relation would lead us to suppose he was in the habit of doing with all his inventions; but if he had treated the problem purely mathematically, as, on the other hand, some of his expressions seem to indicate, our admiration cannot be the less, when we find his abstract speculations, so subtile it would seem as to have escaped the catoptric penetration of Descartes himself in the succeeding century, completely verified by the experiments of Kircher. Napier, indeed, uses the expression of "one mathematical point, in the which point most necessarily it engendereth fire;" which might

* Ars magna lucis et umbræ in decem libros digesta.—Lib. x. pars iii., *Magia Catoptrica*. Kircher wrote many philosophical works; he was not born at the date of Napier's inventions, the year of his birth being 1601.

seem to exclude him from an experiment whose spot of combustion was one of very sensible dimensions. The expression, however, is natural to one who had solved the problem geometrically, and had ascertained the relative position of the burning point by mathematical laws; but that he did not even mean the concentrated focus of a parabola is apparent, as he expressly rejects that figure for his speculum. He mentions, indeed, not mirrors, but "a burning mirror;" it is obvious, however, that he did not intend to be very explicit as to his machinery; and when he speaks of "receiving dispersed beams of the sun," and reflecting "the same beams altogether united," this, on the other hand, reminds us strongly of the reiterated reflections of Kircher. The latter, however, limited his experiment to the distance of a hundred feet; Napier proposed to burn "the enemy's ships at whatsoever appointed distance." *Hoc opus, hic labor est*, as Leonard Digges well remarked when he proposed to make the focus burn more fiercely the further it was thrown. Our own philosopher's proposal will be best illustrated by the experiment of one greatly distinguished in modern science.

The Count de Buffon, led to the consideration not by studying the ancient historians, or from being acquainted with the fact of Napier's proposals, or Kircher's experiment; but because he was unwilling to bow like some of his friends before the shrine of Descartes; set himself to construct mirrors capable of burning at the distance even of 300 feet. He was aware of the limited powers hitherto observed both in reflecting and refracting surfaces, and he at once perceived the practical difficulties in the way of constructing a mirror of sufficient demensions to cast a burning point 200 feet off. After many ingenious experiments by which he ascertained the best reflecting substances, and also how much of the sun's direct heat was lost by reflection, he arrived at the fact, that a large and a small mirror respectively produced, at great distances, an image of the solar rays not sensibly differing from each other except in temperature; and always of a circular form, whatever might be the figure of the plain mirror.

Reasoning mathematically upon these experiments he arrived at the conclusion, "que *les courbes*, de quelque espèce qu'elles soient, ne peuvent être employées avec avantage pour *brûler de loin*, parce que le diamètre du foyer de toutes les courbes ne peut jamais être plus petit que la corde de l'arc qui mesure un angle de 32 minutes, et que par conséquent, le miroir concave *le plus parfait*, donc le diamètre seroit egal à cette corde, ne feroit jamais le double de l'effet de ce miroir plan de même surface: et si le diametre de ce

miroir courbe étoit plus petit que cette corde, il ne feroit guère plus d'effét qu'un miroir plan, de même surface. Lorsque j'eus bien compris ce que je viens d'exposer, je me persuadai bientôt à n'en pouvoir douter, *qu' Archimède n'avoit pu brûler de loin qu' avec des miroirs plans;* car indépendamment de l'impossibilité où l'on étoit alors, et où l'on seroit encore aujourd'hui, d'exécuter des miroirs concaves d'un aussi long foyer, je sentis bien, que les réflexions que je viens de faire ne pouvoient pas avoir échappé à ce grand mathematicien." Now, had Napier written the sentence we have quoted, in reference to his own catoptric proposition, which, like Buffon's, was " pour brûler de loin," we cannot conceive that he would not have been held to have performed his promise of " an evident demonstration of their error who affirm this, [i. e. the burning mirror,] to be made a parabolic section."

It would carry us too much into detail to give a minute description of the mirror, or combination of mirrors, which the laborious experiments and mathematical speculations of the Count de Buffon led him to construct. It is sufficient here to say, that he combined 168 portions of plain glass mirror (the dimensions of each being six inches by eight) by fixing them in a frame, with intervals betwixt them to admit the free and independent motion of each in every direction, and, consequently, the application of their united reflections to the same spot. The machinery for this purpose was very complicated, but the result more than answered the philosopher's most sanguine expectations. Some of these we cannot resist noticing, as they serve so well to sustain the simple truth of Napier's concluding expressions, " these inventions, by the grace of God, and work of expert craftsmen, I hope to perform ;" and to give something more of a philosophical character to that proposal than belongs to the vaunting dreams of Cardan or Bishop Wilkins. *

The first experiment which Buffon made was upon the 23d of March 1747, at mid-day, when, having cast the united reflections of only forty of his glasses

* Kircher (Magia Catoptrica) exposes the ill-digested and purely hypothetical proposal of Cardan to cause combustion from the portion of a sphere at the distance of a thousand feet; and exclaims, " Good God, how much folly in a few words from one so learned withal." But the following out-Herods Herod. " By these mechanical contrivances it were easy to have made one of Sampson's hairs that was shaved off, to have been of more strength than all of them when they were on; by the help of these arts it is possible (as I shall demonstrate) for any man to lift up the greatest oak by the roots with a straw, to pull it up with a hair, or to blow it up with his breath."—*The Mathematical and Philosophical Works of the Right Rev. John Wilkins, late Lord Bishop of Chester*, 1708.—p. 55.

upon a beech plank rubbed with pitch, at the distance of sixty-six feet he set it on fire, under disadvantageous circumstances. On the same day, having adjusted his mirror more adroitly, he set fire to a plank rubbed with pitch and sulphur, by the application of ninety-eight glasses, at a distance of 126 feet. He made a third experiment in the following month, in the afternoon, when the sun was weak and the light pale, the result being a slight combustion produced upon a plank covered with pieces of wool, from 112 glasses at the distance of 138 feet. The following morning, when the sun was pale and cloudy, 154 glasses, at the distance of 150 feet, produced smoke from a pitch plank in less than two minutes; but the sun suddenly disappeared when the plank was on the point of flaming. His next experiment was at three o'clock in the afternoon, when the sun was yet more feeble; and upon this occasion, chips of fir-wood, rubbed with sulphur and mixed with charcoal, flamed in less than a minute and a-half, under 154 glasses, at the distance of 150 feet.* Many other experiments were all more or less successful; and the Count declares, that, with the same mirror, (for like Napier he speaks of *a mirror*, though it was composed of 168 separate reflectors,) under a summer sun and clear sky, he has set fire to wood at the distance of 200 and 210 feet, and was convinced that four such mirrors would be equally successful at the distance of 400 feet, and further. Again, we say, that had these very experiments been instituted by Napier in support of his own professions, it must have been admitted, that, "with the aid of expert craftsmen," he had performed his promise to cause combustion, by united reflections, at a point mathematically determined in relation to the glasses used; and this too "at whatsoever appointed distance;" for it is obvious that Buffon's principles were capable of indefinite extension, at least within human means, which are necessarily finite. †

* Sir David Brewster, in his article Burning Instruments, Edin. Encyclop. states this experiment as having been made at 250 feet, and that the effect was produced in two minutes and a-half. But M. Buffon in his paper says, "à 150 pieds de distance," and, "en moins d'une minute et demie."

† We cannot refrain from quoting one other passage from the Count de Buffon's paper, as in all its expressions it might have come from Napier as the theory of his first catoptric proposition. "La théorie de mon miroir ne consiste donc pas, comme on l'a dit ici, à avoir trouvé l'art d'inscrire aisément des plans dans une surface sphérique, et le moyen de changer à volonté la courbure de cette surface sphérique; mais elle suppose cette remarque plus délicate, et que n'avoit jamais été faite, c'est qu'il y a presque autant d'avantage à se servir de miroirs plans que de miroirs de toute autre figure, dès qu'on veut brûler à une certaine distance, et que la grandeur du miroir plan est déterminée par la grandeur de l'image à cette distance, en sorte qu'à la distance de 60

It was not, he tells us, until he was busy with his mirror, that he became acquainted with the precise details of Archimedes' operations, as recorded by ancient writers; and this was only in consequence of being presented with a classical dissertation on the subject by its author, and his friend, M. Melot.* What is yet more singular, it was only in this way that he became aware of the fact, that Kircher had turned his attention to the subject, and had successfully, though less perfectly, applied the very same principle. It is well for his fame in this matter that he was ignorant of Kircher's works; as his own extension of the principle depended more upon *expert craftsmen* than anything else; but had he been thoroughly imbued with all that historians have written on the subject, from the marvellous Livy to the Byzantine Tzetzes, (which was all that Napier *could* have had to assist him,) it would not have taken a leaf from his laurels, as their details are scarcely intelligible. The old authors who have mentioned the burning mirrors of Archimedes are, Lucian, Galien, Anthemius de Tralles, Eustathius, Tzetzes, and Zonaras. Of these, Anthemius alone is scientific. He lived about the end of the fifth century; and it is curious to observe how completely his demonstrations agree with the experiments pursued by Kircher and Buffon. He supposes a hexagonal mirror, surrounded by other moveable mirrors of the same kind; to these he adds others indefinitely, and the more the better; and, by directing their united reflections to the same spot, proposes to effect combustion at a distance. Napier, as already observed, could scarcely have seen this fragment; but he may have read a passage of Tzetzes (who obviously derives his description from Anthemius,) which has been much disputed. That the reader may

pieds, où l'image du soleil a environ un demi-pied de diamètre, on brûlera à peu-près aussi-bien avec des miroirs plans d'un demi peid qu'avec des miroirs hyperboliques les mieux travaillés, pourvu qui'ls n'aient que la même grandeur. De même avec des miroirs plans d'un pouce et demi, on brûlera à 15 pieds à peu-près avec autant de force qu'avec un miroir exactement travaillé dans toutes ses parties, et pour le dire en un mot, un miroir à facettes plates produira à peu-près autant d'effet qu'un miroir travaillé avec la dernière exactitude dans toutes ses parties, pourvu que la grandeur de chaque facette soit égale à la grandeur de l'image du soleil; et c'est par cette raison qu'il y a une certaine proportion entre la grandeur des miroirs plans et les distances, et que pour brûler plus loin, on peut employer, même avec avantage, de plus grandes glaces dans mon miroir que pour brûler plus près."—*Invention de Miroirs pour brûler à de Grandes Distances. Supplement à l'Histoire Naturelle*, T. i. p. 399, *et infra.* See also *L'Académie des Sciences, année* 1747.

* "Feu M. Melot, de l'Académie des Belles-Lettres, et l'un des Gardes de la Bibliothèque du Roi, dont la grande érudition et les talens étoient connus de tous les Savans."—*Buffon.*

see how little assistance our philosopher could have derived from that source, it is here given with as literal a translation as it will bear.

Ὡς Μάρκελλος δ' ἀπίστησε βολὴν ἐκείνας τόξου,
Ἑξάγωνόν τι κάτοπτρον ἐστέκτηνεν ὁ γέρων,
Ἀ'πὸ δὲ διαστήματος συμμέτρου τοῦ κατόπτρου,
Μικρὰ τοιᾶυτα κάτοπτρα θεὶς τετρασπλᾶ γωνίαις
Κινέμενα λεπίσι τοῖ κάι τίσι γογγλυμίοις,
Μέσον ἐκεῖνο τέθεικεν ἀκτίνων των ἡλιου,
Μεσημβρινῆς, καὶ θερινῆς, καὶ χειμεριωτάτης,
Ἀνακλωμένων δὲ λοιπὸν εἰς τοῦτο τῶν ἀκτίνων,
Ἐξάψις ἦρθη φοβερὰ πυρώδης τοῖς ὁλκάσι
Καί ταύτας ἀπετέφρωσεν ἐκ μήκους τοξοβόλου. *

" But Marcellus having removed them [the ships,] to the distance of a bow-shot, the sage constructed a certain hexagonal mirror; but at a proportional [or convenient] distance from this mirror, placing at angles four rows of such like other small mirrors, moveable by means of plates and certain hinges, he put it [the main mirror] in the midst of [opposite to] the sun's rays at noon, ***both summer and winter.*** Now the rays being reflected in it, a tremendous fiery conflagration arose in the ships; and, at the distance of a bow-shot, he reduced them to ashes." † This passage is so obscure, that it is not certain

* Joannis Tzetzæ Historiarum, Chiliade II. vv. 118—127.

† I have adopted the Greek version which Kircher adopts, and which gives the additional fact of the mirror being *hexagonal*. But a more popular reading is ἐξάγων ὄντι, from ἐξάγω to bring out or produce. In that case, the translation would run thus:—" The sage, *bringing out* the mirror which he had made." M. Dupuy remarks, " Le texte de l'édition de Bâle, 1546, portoit ἐξάγων οντι, et dans une note marginale Ancanthérus a eu raison de corriger ἐξάγωνόντι; car l'Historien ne parle que d'apres Anthémius, qui avoit proposé un miroir héxagone. Dans le Recueil des *Poetæ Græci*, imprimé à Genève, Tom. ii. p. 229, on lit ἐξάγων ὄντι, un esprit doux sur l'o au lieu du rude."—*L'Academie des Inscriptions.* But the facts that Anthemius unquestionably speaks of a *hexagonal* mirror, and that Tzetzes takes the description from him, appear to me decisive of the reading. The passage requires a comment, as modern *savans* of the first class are gradually corrupting it more and more. *Montucla* gives the passage, because, says he, it is remarkable in many respects; but he only affords a rude Latin version, and does not attempt to translate that, which moreover he misquotes; for συμμέτρου in the third line, an important word, he gives *commemorati*, instead of *commensurati*, or *commensurata*, which is the better version. Professor *Peyrard* translates the second line thus:—" Le vieillard *fit approcher* un miroir *hexagone*," &c. Sir David Brewster has it, " The old man *brought out* a *hexagonal* mirror which he had made." This is one way of conquering the difficulty, for they thus make the dubious words yield *both* conflicting meanings at once.

whether the shape of the mirror be mentioned or not, and the expressions translated " both summer and winter," and which probably indicate some relative positions betwixt the glass and the solar rays, have never obtained a satisfactory commentary. But we cannot doubt that the secret of Archimedes was just some modification of the plan which Anthemius and Kircher, and Buffon, all independently discovered; and that Napier, with equal originality, had done so before the year 1596.

A translation of the works of Archimedes was executed by M. Peyrard in 1808 at the desire of the French Institute. That author added to his labours a very able paper demonstrative of his own improvements upon the burning mirror of Buffon. In this, which was formally reported upon and approved of by the Institute, the reader who wishes to follow out the subject will find very minute scientific details. We shall only quote Peyrard's conclusion, which must exonerate Napier's catoptric propositions from every charge of chimerical wildness, so long as the Institute of France shall be the throne of science. " Nul doubte, du moins je le pense, qu' avec 590 glaces de cinq décimètres de hauteur, on ne fût en état d'embraser et de reduire en cendres une flotte à un quart de lieue de distance; à une demi-lieue, avec 590 glaces d'un mètre de hauteur, et à une lieue, avec 590 glaces de deux mètres de hauteur." *

Our philosopher's second invention, in the paper under consideration, it is not easy to illustrate. He professes to be able to produce the same astonishing results by means of reflection from any material fire or flame. This secret appears to be peculiarly his own, and to have died with him; for the nearest approach to it, that I can discover, is obviously very remote from the results he anticipated. Christianus Wolfius mentions in his Catoptrics, that an experiment had been made at Vienna to obtain combustion from a common fire, which had succeeded in this manner. Two concave specula, composed of fine brass, the one six feet in diameter and the other three, were arranged at a distance from each other of twenty or twenty-four feet. A coal fire was placed in the focus of the larger mirror; and in the focus of the small one, a chafing-dish and candle with a sulphur wick. The reflected rays of the fire ignited the candle. † But this obviously affords very little support to the scheme of

* T. ii. p. 486.

† " Experimento id comprobatum Viennæ testo Zahnio, ope duorum speculorum concavorum ex lamina orichalcea confectorum. Majus erat 6, minus 3 pedum, distantia eorundem 20 vel 24 pedum. In foco majoris constituti erant carbones candentes, in foco minoris ignitabulum cum

burning the enemy's ships at an indefinite distance, by means of the reflection of any material fire in a single mirror. It would, however, be exceedingly rash to pronounce a proposition of Napier's, so positively and formally asserted, to be beyond the limits of science; and the modern verification of his first proposition is an additional reason for treating his second with respect. We must recollect, that, from the state of science in his day, especially in Scotland, he must have been chiefly indebted to the geometrical and algebraical powers of his own mind for the success of his speculations; and those who have studied most deeply the steps by which he created the logarithms and unfettered calculation, and who are best able to appreciate his celebrated trigonometrical theorems, will know best how little danger there was of his being misled by such mental resources into the crude and visionary marvels, even of men so able as Cardan and Baptista Porta.* The latter ingenious author had, ten years after Napier's birth, given perhaps the only remarkable impulse to optical science which it received since the labours of Roger Bacon, who, with all his devotion to the subject, had added little to those of Ptolemy and Alhazen. This last-mentioned philosopher, an Arabian who flourished in the eleventh century, was the successor of Ptolemy in optical discovery, though a thousand years divided them. He distinguished himself greatly by the originality and recondite nature of his geometrical applications to the rectilineal propagation of light, and in some respects excelled his master. Ptolemy, whose work on optics, however, was unknown in Napier's day, connects immediately with Euclid, who is supposed to have derived from the school of Plato the fundamental principles of optics, as regards the theory of direct light, and also

filo sulphureo candelæ circa apicem circumligatum. Radii carbonum reflexi candelam accendebant."—*Elementa Catoptricæ*, Chap. iv. p. 156. I have presumed that the 6 and 3 feet are the measure of the diameter of the specula, and not their focal distance.

* *Joh. Baptistæ Portæ Neapolitani, Magiæ Naturalis, libri viginti. Amstelodami*, 1664.—A curious work, full of scientific trifles. It is in this work he describes his beautiful and popular invention of the *Camera Obscura*. Professor Playfair observes, "He appears to have been a man of great ingenuity; and though much of the Magiæ Naturalis is directed to frivolous objects, it indicates a great familiarity with experiment and observation. It is remarkable that we find mention made in it of the reflection of cold by a speculum,—an experiment which of late has drawn so much attention, and has been supposed to be so entirely new. The cold was perceived by making the focus fall on the eye, which, in the absence of the thermometer, was perhaps the best measure of small variations of temperature." Let no man hastily deride Napier's second proposition.

of catoptrics or reflected light, to which our philosopher's propositions belong. The impulse which optics acquired from Kepler and Descartes was of a later date than Napier's speculations.

The third item of his secret inventions is clearly the warlike instrument described by Sir Thomas Urquhart; nor is there any thing more marvellous in the story than what might be made to appear from a covert description of many well known and successful efforts of mechanical genius. Coupling the anecdote in the Jewel with Napier's own declaration, we have no doubt that he had constructed such a machine, and that it was actually tried in the neighbourhood of Edinburgh or Stirling. But some allowance must be made for the Knight of Cromarty's peculiar vein, especially as he does not pretend to have been an eye-witness; and that part of his story, therefore, may be doubted, wherein he declares the experiment to have been made "to the destruction of a great many head of cattle and flocks of sheep." Our philosopher was too patriarchal to destroy his own flocks and herds,—too honest to kill his neighbours,—and too humane thus wantonly to massacre any of God's creatures. We verily believe, that had he been placed with his secret artillery in the most convenient situation for scattering the "Great Turc" and Antichrist himself to the four winds of Heaven, the machine would have received no impulse from his hand, though he might have hurled at the enemy the last sentence of his scriptural commentaries, "O Rome! repent therefore always, in this thy latter breath, as thou lovest thine eternal salvation." There is a tradition, that this "*infernal machine*" of the sixteenth century was buried somewhere in the neighbourhood of Gartness by order of the inventor himself, which agrees with the sentiment he is said to have expressed on his deathbed. It is curious to find the very sentiment echoed about a century afterwards, and under circumstances somewhat similar, by Sir Isaac Newton to one of the Gregories. The name of Gregory will be remembered in Scotland until science is forgotten. Dr David Gregory of Kinnairdy, (ancestor of the celebrated Dr John Gregory,) among other philosophical attainments, was a most ingenious mechanic. Of him the anecdote is told by a relative of the family,* that

* Dr Reid, nephew of Dr John Gregory.—*See his Additions to the Life prefixed to his Uncle's Works, printed at Edinburgh*, 1788.

"Kinardie is above forty English miles north from Aberdeen, He (Dr David Gregory,) was a jest among the neighbouring gentlemen for his ignorance of what was doing about his own farm, but an oracle in matters of learning and philosophy." This was very different from Napier, who,

" about the beginning of the last century, he removed with his family to Aberdeen; and, in the time of Queen Anne's war, employed his thoughts upon an improvement in artillery, in order to make the shot of great guns more destructive to the enemy; and executed a model of the engine he had conceived. I have conversed with a clock-maker in Aberdeen who was employed in making this model; but having made many different pieces by direction, without knowing their intention, or how they were to be put together, he could give no account of the whole. After making some experiments with this model which satisfied him, the old gentleman was so sanguine in the hope of being useful to the allies in the war against France, that he set about preparing a field equipage, with a view to make a campaign in Flanders; and in the meantime sent his model to his son, the Savilian professor, that he might have his and Sir Isaac Newton's opinion of it. His son shewed it to Newton without letting him know that his own father was the inventor. Sir Isaac was much displeased with it, saying, that, if it tended as much to the preservation of mankind as to their destruction, the inventor would have deserved a great reward; but, as it was contrived solely for destruction, and would soon be known by the enemy, he rather deserved to be punished; and urged the professor very strongly to destroy it, and, if possible, to suppress the invention. It is probable the professor followed his advice; for at his death, which happened soon after, the model was not to be found."

The mechanical automata, both of ancient and modern days, have left nothing incredible in that department of science; and when we turn from the artificial eagle and the iron fly of Regiomontanus, to the destructive mechanism of Napier, the latter appears, by comparison, a very humble effort. Nay, such is the universal reliance upon human powers in this respect, that Sir David Brewster, in a recent popular work, states, as a fact of which he expresses not the slightest doubt, that Janellus Turrianus of Cremona, who had for his pupil in such arts the Ex-Emperor Charles V., " exhibited corn-mills so ex-

there is good reason to believe, was an oracle in agricultural science as well as in mathematical. Dr Reid also mentions a fact with regard to David Gregory, which shows how well Napier must have managed matters to be the idol of his own Presbytery. " He was the first man in that country (Aberdeenshire) who had a barometer. He was once in danger of being prosecuted as a conjuror by the Presbytery, on account of his barometer. A deputation of that body waited upon him, to inquire into the ground of certain reports that had come to their ears. He satisfied them so far, as to prevent the prosecution of a man known to be so extensively useful by his knowledge of medicine."

tremely small that they could be concealed in a glove, yet so powerful, that they could grind in a day as much corn as would supply eight men with food for a day." * There is nothing marvellous, therefore, in Napier's mechanical inventions; and we may give him the fullest credit for having constructed them. They afford, however, a most interesting proof of the universal grasp of his genius. A machine is well defined, as being any thing that serves to augment or to regulate moving powers, or any body destined to produce motion, so as to save either time or force; and in their theory two principal problems present themselves: the first is to determine the proportion which the power and weight ought to have to each other, that they may just be in equilibrio; the second is to determine what ought to be the proportion between the power and the weight, that a machine may produce the greatest effect in the given time. Now, we cannot conceive a mind like Napier's to have been turned to this subject, and, as he himself says, successfully, without having deeply pondered and mastered these principles. But we must recollect that the very foundations of modern mechanical science were then hardly laid. About twenty years afterwards, Galileo was still busied with examining the strength and resistance of beams of different sizes and forms, and speculating on the motion of projectiles. "Before the end of the sixteenth century," says Professor Playfair, "mechanical science had never gone beyond the problems which treat of the equilibrium of bodies, and had been able to resolve these accurately only in the cases which can be easily reduced to the lever. Guido Ubaldi, an Italian mathematician, was among the first who attempted to go farther than Archimedes and the ancients had done in such inquiries. In a treatise which bears the date of 1577, he reduced the pulley to the lever; but with respect to the inclined plane, he continued in the same error with Pappus Alexandrinus, supposing that a certain force must be applied to sustain a body, even on a plane which has no inclination. Stevinus, an engineer of the Low Countries, is the first who can be said to have passed beyond the point at which the ancients had stopped, by determining accurately the force necessary to sustain a body on a plane inclined at any angle to the horizon." "The person who comes next in the history of mechanics made a great revolution in the physical sciences. Galileo was born at Pisa in the year 1564," &c.

* Letters on Natural Magic, addressed to Sir Walter Scott, by Sir David Brewster. 1832. P. 266.

Thus both statics and dynamics were little understood at the time when our philosopher busied himself with inventions, depending so much upon a knowledge of the composition and resolution of forces; and although another destiny was in store for him than to create a new era in that department of science, we see that he was not incapable of having done so. The modesty of his nature, and the brevity which, as his son informs us, was peculiarly characteristic of his style, entitle him to the credit of having studied mechanics far more extensively than he discloses in this paper; and his concluding expressions, "besides devices of sailing under the water, with divers other devices and stratagems," may cover what Kircher or Baptista Porta would have swelled into a folio. The proposal of *sailing under the water* indicates a further extension of his mechanical speculations beyond the resources of his times. Archimedes had determined the weight of bodies immersed in fluids, and also the position of bodies floating on them; but the fundamental principle of modern hydrostatics, that the pressure of fluids is in proportion to their depth, was only laid by the work of Stevinus, which appeared not sooner than 1600. The diving-bell had not been invented; and our philosopher was here venturing into a region literally unexplored. It is not improbable, considering the chemical propensities of the family, that Napier, besides the more ordinary contrivances for preserving respiration under water, had discovered a fluid, the effect of which was to restore corrupt air to a respirable state. There seems to be no doubt that such a liquor had been obtained, through recondite chemical means, by a foreigner of the name of *Cornelius Drebell*, some years after the date of the Lambeth paper. This Dutchman was curious and ingenious in natural magic, but not at all averse to the reputation of originality in matters where he had not the right. The microscope, telescope, and thermometer, have all been ascribed to him upon grounds considered extremely equivocal.* It is not unlikely that the secret narrated in the following anecdote was just what Napier had discovered; and if Drebell was one of those foreigners who originally came over to this country to look after the mines and minerals, the surmise would be still more plausible. The Honourable Robert Boyle, so distinguished in the annals of philosophy, mentions, in a work addressed to his nephew, Lord Dungarvan, "A conceit of that deservedly famous mechanician and chymist, Cornelius Drebell, who, among other strange things that he performed, is affirmed, by more than a few credible persons, to have contrived, for the late learned King James, a

* Montucla, Histoire des Mathematiques, Tom. ii. p. 237.

vessel to go under water; of which tryal was made in the Thames with admired success, the vessel carrying twelve rowers, besides passengers, one of which is yet alive, and related it to an excellent mathematician that informed me of it. Now that for which I mention this story is, that, having had the curiosity and opportunity to make particular enquiries among the relations of Drebell, and especially of an ingenious physitian that marryed his daughter, concerning the grounds upon which he conceived it feasible to make men, unaccustomed, to continue so long under water without suffocation, or (as the lately mentioned person that went in the vessel affirmes) without inconvenience,—I was answered, that Drebell conceived, that 'tis not the whole body of the air, but a certain quintessence (as chymists speake) or spirituous part of it, that makes it fit for respiration, which being spent, the remaining grosser body, or carcase (if I may so call it) of the air, is unable to cherish the vital flame residing in the heart; so that, (for ought I could gather,) besides the mechanicall contrivance of his vessell, he had a chymicall liquor, which he accounted the chiefe secret of his submarine navigation. For when from time to time he perceived that the finer and purer part of the air was consumed, or over-clogged by the respiration, and steames of those that went in his ship, he would, by unstoping a vessell full of this liquor, speedily restore to the troubled air such a proportion of vital parts, as would make it again for a good while fit for respiration, whether by dissipating or precipitating the grosser exhalations, or by some other intelligible way, I must not now stay to examine, contenting myself to add, that, having had the opportunity to do some service to those of his relations that were most intimate with him, and having made it my business to learne what this strange liquor might be, they constantly affirmed that Drebell would never disclose the liquor unto any, nor so much as tell the matter whereof he made it, to above one person, who himself assured me what it was." *

There are not wanting other most interesting indications that Napier scarcely left any branch of science untouched,—that his gigantic mind applied itself to the Heavens and the earth, and the waters under the earth,—and that the mortal whom he emulated was ARCHIMEDES. The spiral pump or screw which bears that philosopher's name is universally known. It was invented

* "New Experiments, Physico-mechanical, touching the spring of the air and its effects, &c. written by way of Letter to the Right Honourable Charles Lord Viscount of Dungarvan, eldest son to the Earl of Corke. By the Honourable Robert Boyle, Esq." 1662. p. 188.

by Archimedes when in Egypt, to enable the inhabitants to get rid of a superabundance of inundation, and acts upon the principle of causing a body to rise, from its propensity to fall,* a paradoxical effect which caused Galileo to exclaim, "*la quale inventione non solo è maravigliosa, ma è miracolosa.*" † Colonel M'Kenzie, whose celebrated Asiatic researches, originating in collections for a Life of John Napier, have already been mentioned, ‡ drew up his report upon those collections for the Honourable Mrs Johnston in 1786, which is supposed to be now among the papers at the India House. I have been much disappointed in not procuring a copy of this document, or a more perfect knowledge of its contents; but the following information respecting it was communicated by one who could not be misinformed as to its import:—"This report contains a great deal of curious information which the Colonel had discovered, while investigating the subject in Scotland, upon the improvement which had been made by John Napier in the machine invented by Archimedes, and known by the name of Archimedes' Screw, for the purpose of raising water. It appears to the Colonel, that a statement of that invention had been carried out to India by some of the Portuguese, and had been adopted by the natives from the Portuguese who were established at Goa, and used in some parts of the peninsula of India for the practical purpose of irrigation. M'Kenzie saw an instance of it, and was perfectly satisfied that the natives of India could not have adopted it from the original discovery of Archimedes, but must have adopted it after the improvement had been made by Merchiston, because the machine which he saw was not in the original, but in the improved form, as described in a paper which he had found in Scotland upon the death of the fifth Lord Napier, giving an account of different machines which had been made or improved upon by Merchiston." §

When the paper containing Napier's schemes came into the hands of Anthony Bacon, Francis Bacon, his younger brother, had acquired none of his eminence political or philosophical, so its presence in that collection cannot be

* That is to say, the water only rises in the screw in proportion to its descending power first applied.

† Œuvres d'Archimède, par F. Peyrard, Professeur de Mathematiques et d'Astronomie au Lycée Bonaparte. Dedie à sa Majesté l'Empereur et Roi. 1808.

‡ See Preface.

§ Letter from the Right Honourable Sir Alexander Johnston; to whose kindness I have been indebted for several communications in the course of compiling these memoirs.

considered to indicate any scientific correspondence betwixt the stars of the sister kingdoms. It has generally been called "a letter to Anthony Bacon;" but I suspect it may be traced into his hands otherwise than by a direct communication from the philosopher himself. In doing so, we must again recur to the connection betwixt our philosopher's near relatives and the history of the times.

Adam Bishop of Orkney died in the year 1593, and was buried beneath one of the pillars of the aisle of Holyrood, where his grave is yet shown to the curious stranger. We shall not say

> In Santa Croce's holy precincts lie
> Ashes which make it holier.

But, notwithstanding all the promises contained in the bishop's letters, his illustrious nephew did not succeed to one farthing of his estate. Like Benedict, when he said he would die a bachelor the bishop did not expect to live to be married. He married, some time before the year 1571, a niece of the good Regent Mar, whose wife was the cousin-german of Sir Archibald Napier. The eldest son of this marriage was John Bothwell, who succeeded his father both in his seat on the bench, and in his abbacy. He became a great favourite with James VI., and inherited so little of his grandfather Francis Bothwell's dislike to masking and mummery, that he was always ready to play the fool whenever his sovereign required him. In the year 1594, a few months after the philosopher's letter of admonition to the king, the baptism of Prince Henry occurred, when his majesty entered the lists of the tournament, given upon that occasion, disguised as "a Christian;" while Napier's cousin, "the Abbot of Holyroodhouse," appeared at the same time as "an Amazon in women's attire, very sumptuously clad." * By these and other courtly arts, John Bothwell stood high in the king's favour, and rose to the peerage under the title of Lord Holyroodhouse. †

* "An exact Account of the Babtism of Henry Prince of Scotland, August 30, 1594."

† The following document, from the original in the Register-House, affords a curious picture of the footing upon which James was with his courtiers, and the manner in which he paid his debts:—

"Rex. We, having consideratioun that, in the yeir of God 1m vc foure score and —— yeris, we borrowit and ressavit fra our traist counsallour, Adam Bishop of Orknay, commendator of Halyrudhous, the soume of fyve hundredth pundis money of this realme, for refounding of the whilk soume we gave and layd in pledge to him ane greit rubie set in golde, whilk rubie, Johnne,

Some years before this accession of rank he had formed a strict alliance of political friendship with Anthony Bacon, and was in correspondence with him, probably in connection with those intrigues which were intended to secure the undisputed succession of James VI. to the throne of England, in the event of the demise of Queen Elizabeth. The following original and unpublished letter is from the Lambeth Collection, and appears to have been received by Anthony Bacon about the time when he obtained Napier's summary of secret inventions.

" A Tresnoble et vertueux Seigneur Monsieur Antoine Bacon, Esquier.

" Monsieur souventesfois m'est venu en l'entendement le service que je vous ay voué, mais n'ay eu jamais occasion de vous le tesmoigner jusques a present, esmeu par je sçay quelle memoire de vos vertus, qui de jour en jour prennent accroissement parmi les plus grands de ce pais, et souhaitent comme moy vostre bonne santé, le Roy m'en a souvent parlé, mais de cela il n'est propre a present d'escrire : Je feray tous les bons offices qui me seront possibles encore qu'il n'y en ait point de besoing. Toutes fois, si me voulez faire l'honneur de m' employer, me trouverez, selon nostre promesse confermée a Bourdeaulx, fort content de satisfaire a l'opinion q'aviez conceve de moy. Au reste, il n'y a rien que je souhaite plus que vostre bonne sante et advancement au plus haut estage d'honneur que pas un de vos tres nobles ancestres ; vous priant de m'escrire a toutes occasions, et me faire entendre ce que vous autres faites par dela. Je

now Commendatar of Halyruidhous, sone and air to the said umquhile Adam, his father, hes reallie, and with effect, instantlie redylevrit to us, but [without] payment of the siad soume to him be us, whereupon the samyn was impignorat ; and tharefore, we, with advyce of the Lords of Secreit Counsall, and officiars under subscryvand, be the tenor heirof, grantis and confessis us to have ressavit the same rubie set in gold, in als gude estait as we delyverit the same, fra the said Commendatour, now of Halyruidhous ; and tharefore, we, with consent foirsaid, exoners, quyt clames, and dischargeis the said commendatar of the samyn for ever : and renounces and dischargeis all actioun and instance that we may have against him as sone and air to his said father, as also the executors and intromettors with the umquhile father's guds and geir for the same rubie, and redelyvery thereof for ever, &c. Subscryvit with our hand at Halyrudhous the four day of Januar 1595 yeiris."

m' acquiteray de mesmes envers vous, et demeureray, apres vous avoir baise bien humblement les mains, Monsieur,

" Vostre tres affectionne et tres serviable serviteur.

" *Halyrudhous.*

" Ce mien parent, porteur de la presente, en Octobre dernier trouva beaucoup de courtoisie en Monseigneur d'Essex, qui luy enjoignit quelque particularite, laquelle luy mesme vous declarera. Mais d'autant que j'ay entendu que Monseigneur est absent, je vous supplie pour ce regard de suppleer son absence, a quoy je m'asseure de vostre bonne affection.—xxvii Juil. 1596." *

The statesman to whom this letter is addressed, was the eldest son of Sir Nicholas Bacon, and his second wife Anne Cook; and the brother-german of the great Verulam. He spent many years of his youth abroad, and was much at Bourdeaux, where he met John Bothwell. He returned to settle in his own country about the year 1591, and attached himself with the most enthusiastic devotion to the service and friendship of Robert Devereux Earl of Essex, the lover, the hero, and the martyr of Queen Elizabeth. Anthony Bacon's voluminous papers and correspondence are reposited in the library at Lambeth Palace, and from these it is evident that the secretary of state himself was scarcely more engrossed with public affairs, or more generally regarded in state negociations than he was, at the period when our philosopher's schemes for destroying the enemy came into his hands. These must have been submitted to him, (perhaps by Sir William Stewart, or by the relative whom John Bothwell mentions in his letter,) not simply on account of their scientific curiosity. When we compare the dates of that paper with those of public events at the time, the fact is very naturally accounted for, that one so unassuming as our philosopher should have offered to the whole island his Archimedean powers, and have afterwards cast them aside, and even refused to give them further publicity. The moment was one of great excitement in both countries, and that excitement arose from the very circumstances which for years had engrossed the mind of Napier, even in the midst of his scientific speculations;

* *Lambeth MS. Bacon's Coll.* v. fol. 116. *orig.* I am also indebted to the liberality of His Grace the Archbishop of Canterbury for this letter, which is not in Birch's Collection. It is indorsed " Domini Bothwell ou Holirudhouse, le 6me d'Aoust, 1596." Bothwell was not a peer at this time, and his signature must have been as commendator of the Abbey. He was raised to the peerage, with that title, by charter dated at Whitehall 20th December 1607.

namely, the treasonable intrigues of the popish nobility with the King of Spain, "The state of affairs in Scotland at this time, was written in a letter from Edinburgh on the 23d of November 1596, to this purpose: The ministers were in a continual uproar, clamouring against the king and counsellors for the liberty allowed to the excommunicated earls, having shown the king a copy of a respite granted to those lords, to remain for the space of six months in the country, peaceably, unmolested by any man. This respite was subscribed by his majesty, the Duke of Lennox, the Earl of Mar, the Earl of Athol, the Treasurer, President, Mr John Lindsay, and all the rest of the council. But every one of them denied it."* Anthony Bacon's feelings on the state of the times seem to have been congenial with those of Napier. In the very month when the latter drew up his warlike propositions, Bacon begins a letter to his mother, with a pious reflection on the weather, which had been at London extremely stormy and unkindly for the season, "the changes whereof," says he, "as they were used for threatnings by the prophets in antient time, so God grant they may work now in us as due and timely apprehension of God's heavy judgement imminent over us for the deep profane security that reigneth too much amongst us." He then, (adds Birch) informs her ladyship, that an account arrived at court the day before, that the French King and King of Spain, by the entremise of a Florentine cardinal sent into France from the Pope, had made a truce for three months, and that the Grand Signor was for certain on horseback himself, with two hundred thousand men, and likely to be a heavy scourge to Christendom.

Napier's paper, dated on the 7th of June 1596, seems to have been delivered to Bacon in July following. On the 1st of June of that year, the celebrated expedition against Cadiz, in which England acquired so much glory, set sail; the land forces being commanded by Essex, and the fleet by

* "Memoirs of the reign of Queen Elizabeth, from the year 1581 till her death; in which the secret intrigues of her court, and the conduct of her favourite, Robert Earl of Essex, both at home and abroad, are particularly illustrated from the original papers of his intimate friend Anthony Bacon, Esquire, and other manuscripts never before published. By Thomas Birch, D. D." Vol. ii. p. 205.

I find, what I was not aware of when the previous sheets went to press, that Dr Birch has not omitted, in his collections from the Lambeth papers, Napier's scantlings of inventions; of which, however, his transcript is faulty and imperfect. This, probably, is the source from which it found its way into Tilloch's Philosophical Magazine.

the Lord High Admiral, Howard. Most probably Napier's schemes were transmitted to the bosom friend of Essex in reference to this very expedition, the result of which, however, proved how independent Old England was of catoptrics as a means of destroying the enemy's fleet.* With no mirrors but those mirrors of Knighthood, Effingham, Essex, and Raleigh, "Her Majesty defeated and destroyed the best fleet which the King of Spain had together in any place, and amongst those his ships of greatest fame, and in which all the pride and confidence of the Spaniards were reposed. The captains of them confessed, aboard the *Due Repulse*, that forty gallies were not able to encounter one of her Majesty's ships." †

* In like manner, when, in the year 1833, the lineal descendant of our philosopher, Charles Napier, Viscount Cape St Vincent, annihilated the whole naval force of the King of Portugal,—by an action as brilliant in the annals of British prowess as the cause it illustrates is mean in political history,—he preferred boarding to burning glasses.

† "A paper, entitled the Advantages which her Majesty hath gotten by that which hath passed at Cadiz the 21 of June 1596."—*Lambeth Coll.*, Vol. xi. fol. 146.

CHAPTER VIII.

It may be imagined, that after so long a succession of wars and civil commotions, the agriculture of Scotland was at its lowest ebb, and the people reduced to famine. A contemporary chronicle records, that, "during all this yeir (1595) thair was great scant of cornes, and exceiding great derth. The somer was sa raynie, that the maist part of the cornes war rottin on the grunde before that thay war cut doun, and the rest that was cut doun spilt for fault of dry weather. Thair was also a great decay of the bestiall, and manie poor people deit for hungar, and sum of better estait had na better conditioun; for thay war constraynit to sell the best of thair geir to supplie the gredeynes of mercats."* It is remarkable that the first impulse to agricultural activity emanated, while the country was in this state, from the family of Merchiston.

Archibald Napier, the philosopher's eldest son by his first marriage, was educated at the University of Glasgow, which he entered in March 1593. Instead of going abroad after finishing his studies there, he returned home, and became almost immediately attached to the household and person of James VI. "Had I ten sons," exclaimed the famous Scaliger, "not one of them should be scholars, I would make courtiers of them all;"† and such seems to have been the plan adopted by John Napier with regard to his first-born, who tells us himself, "After I had left the schooles, I addressed myself to the service of King James of blessed memory, and wes gratiously receaved by him; and after the death of Queene Elisabeth, I followed his majestie into England, when he went to receave the crowne of that

* Historie of James Sext.

† "Si j'avois dix enfans, je n'en ferois estudier pas un, je les avancerois aux cours des princes." —*Scaligerana.*

kingdome."* It seems, however, that, in the short interval betwixt his leaving college and becoming a courtier, young Napier had so far attended to agricultural matters, as to entitle him to receive the royal gift of a monopoly of a new mode of tillage, which, most probably, the experience of his father or grandfather had discovered. On the 23d October 1598, there is noted in Birrel's Diary, "Ane proclamatione of the Laird of Merkiston, that he tuik upon hand to make the land mair profitable nor it wes befoir, be the sawing of salt upon it." And in the register of the privy-seal appears a grant from King James to "Archbald Naper, apperand of Merchistoun," as one qualified and expert in such matters, of a monopoly of this new mode of tillage for twenty-one years. At the same time there was published, "The new order of gooding and manuring of all sorts of field land with common salts, whereby the same may bring forth in more abundance, both of grass and corn of all sorts, and far cheaper than by the common way of dunging used heretofore in Scotland. Set forth by Archibald Napier, the apparent of Merchistoun, conform to the gift of office given him by the king's majesty under the privy-seal, with advice of the Lords of Council thereof, and made to him thereanent, of the date at Holyroodhouse the 22d of June 1598 years."† We suspect, how-

* "A true relation of the injust persute against the Lord Napier, written by himselfe."—*MS. in the handwriting of the first Lord Napier. Merchiston Papers.*

† "Oure Soverane Lord, considdering the greit proffite and commoditie that may redound universallie to this realme be the diligent cair and paines to be taine in laboring, mukking, and manuring of the ground, in sik sort and manner that wes *never usit nor frequentit within any pairt of the boundis thereof be anie persoun or persouns of before*, and of the greit incres, alsweill of coirnes as grass, as may accress thair throw, and how neidful it is that that invention and pratique be useit and exercesid be ane skillfull persoun, wha hes tane, hantit, and frequentit thairwith in tymes bipast, that, be his expert useing of sick ane lauthfull and rair industrie, greit utilitie may result to this universall commonweill; and understanding that his hienes lovit Archibald Naper, appeirand of Merchinstoun, is ane qualifiet and expert persoun, maist apt and meit for exercesing of sik ane commodious industrie and laboure; thairfore his hieness, with avis of the Lordis of secreite counsal, gevand, grantand to the said Archbald Naper onlie, and to sik others whom he sall depute and substitute, licence and tollerance to use, hant, and frequent the said commodious use and industrie of mukking, laboring, and manuring of all and whatsumevir landis, alsweill manurit, and redin out as unmanurit, within the haill boundis of this realme, alsweill to coirne land as to pasturage and medowis, during the haill space of twentie-ane yeiris nixt efter his entrie thereto, whilk sal be and begin at the date of thir presentis, and that efter sik sort and maner as sal be publischit and sett out be the said Archbald authentiklie in prent; with full powers to him, and his saidis deputes and substitutes, to use and exerce the said industrie within the haill boundis of this realme during the foirsaid space. Dischargeing be thir presents, all and sundrie his hienes lieges,

ever, that young Napier's share in this agricultural discovery must have been very small, though the profits were presented to him, probably, to fit him out in the commencement of his courtly career. He could not have acquired sufficient experience in such matters, and he takes no credit to himself for it in the autobiography he has left. The plan must have undoubtedly originated with his father or grandfather; and, considering the charge the philosopher took of country matters, it is not unlikely that the merit of it chiefly belongs to him. Certainly he cannot be said to have afforded, like David Gregory, any merriment to the neighbouring gentry from that ignorance of farming operations, which, however, would have been excuseable in one deeply immersed in abstract mathematical speculations; and we have no doubt, that, wasted as were the fields round Merchiston during the civil wars, they presented, in those desolate years to which we have brought down the family history, the fairest prospect and the best example in the Lothians. The published account of the Merchiston mode of tillage is too rare and curious to omit. It contrasts finely with the scenes through which we have traced our philosopher; and, compared with his warlike inventions, and the anecdote of his too successful experiment of destructive ingenuity, is placid and warm as Cuyp beside the stormy Borgognone.

" After the corns are win and put into the barn-yard, the piece land tilled, and the wheat seed ended, you shall till down the land whereon you intend to sow down your bear seed; and if the same be clay, or reasonable stiff, and not sandy land, you shall sow on every acre red land thereof one boll of common salt; and if it be sandy ground, one half boll will suffice. Do that upon even and level ground, so soon as you can before every Martinmas, so that the land may have sufficient time to rot and digest the said salt in the winter season, that the salt may temper; make the land moury and soft, and open the same before it be sown with any sort of seed; for the nature of earth being cold, and the nature of the salt being hot, will, with temperate mois-

that they, nor nane of them, *of whatsumevir* estate, qualitie, or condition thay be of, presume, nor tak upoun hand to use, hant, or frequent the foirsaid novation of guiding, mukking, or manuring of thair landis, ather manurit or pasturage, during the said haill space, certefeing thame that dois in the contrair, that they sal be constraint to content and pay to the said Archbald the soume of [ten shillings] for everie aiker tharof that thai sall manure efter that sort and maner, alsweill corne land and pasturage, during the space foirsaid."—*Privy Seal*, 70. 22 *June* 1598.

ture, in summer with heat, accordingly bring forth, God willing, plenty of bear and clean, without weeds. You must in due time till the said land over again once, or in some places twice, very near before the time you should sow your bear-seed, according to your common use of two or three furrows for the most part of our country. But if your land lie hanging or dipping down, you may before Martinmas sow the said salt upon the stubble-land, where you would make your bear; but immediately till the same down, lest the substance of the salt descend over soon from the land by the great showers in winter; and in due time before you sow, you must till the said land once or twice again, according to your custom of bear-land, or as the stiffness of the ground requires, for sandy land needs but twice tilling.

"When you have sown your white seed, you may sow for every boll of wheat, upon reasonable stiff or clay-land, one half boll of salt thereupon, and in sandy ground one firlot of salt; and let all be harrowed together, and hereby, God willing, you may have a good clean crop. In like manner, when you have sown your oat-seed, you may sow three firlots of salt upon every boll of oats sowing; but this must be done upon watery or laigh land only, as upon meadow or haugh land, whereupon the water stands commonly in winter, ye shall, God willing, find a rich crop. But upon dry ground ye shall sow no salt when the oat-seed is presently sown, but before Martinmas, except with wheat, as said is, else you shall rather lose as gain. You shall sow no salt with bear instantly, neither upon wet nor dry ground; but as long before Martinmas as you may, as said is.

"The general rule of salt is, that the same be sown on all sort of land four or five months' space before the same be sown with any seed, and that according to the quantity above specified, more or less, as you shall find by experience your sort of ground may bear. For it is certain, if over much of common dung be laid upon land, or yet over little, [there will be little] or no increase of corn. The like happens in salt, and, therefore, I refer you to experience, and the above quantities.

"Follows the order of pasturage, and to increase the grass, both in abundance and goodness, which being rightly used, may enrich our countrymen wonderfully. Set forth by the foresaid ARCHIBALD NAPIER.

"Let every man cause bigg ten or twelve parks upon two or three year old

ley land at the least, of what bounds he pleases, from the middle of the month of March till the eighth of April, and that the dikes thereof be strong and thick, that they may stand for five or six years or longer at pleasure; and in the first or second day of the said March, let the foresaid whole parks be sown with common salt, nearly one boll to one acre of clay or stiff ground, or with half one boll upon sandy ground.

"The said haill parks should be hained, and not pastured upon till Whitsunday thereafter, that they may be once exceeding good grass, and so will last the longer good. Make your parks so near the one to the other, that upon the said Whitsunday, when your cattle or bestial have eaten the grass of the first park, upon the morrow they may go to the second, and eat in the same; and the third day to eat and pasture in the third, and so forth, till they have eaten the twelfth park; and then to return and eat in the first park, it being cleansed and salted as hereafter.

"The said Whitsunday, which is the first day that you enter and eat the first park, you shall let the cattle feed and pasture themselves until eleven o'clock that you give them water to drink, and thereafter put them into a common fold till two afternoon to dung the same, as use is; and at the said two hours, put them again into the said first park to pasture themselves until eight o'clock at night; then take them forth to drink, and thereafter all night put them to dung in the said common fold; and let them never tarry over night in the said parks.

"When the herd hath folded the cattle at eight hours after even for the night time, he must return to the first park where they eat all the day, and there with a sharp shovel must take up the dung of every cow or ox, and throw it out of the park in a maund or scull; and upon every place where the said dung lay he must sprinkle a little salt, or some earth and some salt sprinkled thereupon, or some salt-pickled water, otherwise the cattle will not eat the grass that grows thereupon where the dung lay; where [as] if salt be put thereupon, they will rather eat that grass than any other.

"When they come about again to the thirteenth day, eat again in the first park; and as the herd has done the first day to the first park, see that he do the same the second day to the second park; and that he fail not to do the same every night as a good servant; and so on the third day to the third park, and so forth till all be eaten, and that they return to the first park. One acre used this way will feed twice as many cattle as otherwise; and the kine fed

thereon will yield twice as much milk as they that are fed on unsalted grass. Every year thereafter, for the space of five years, the said parks will fold more cattle, and they be better fed; and then, if you please to till and sow the said parks for the space of four years thereafter, there will more corn and bear grow than may in a manner stand thereupon. Let the dikes stand notwithstanding the tilling thereof.

"If the use of salt come up this way among us, I doubt not but all men will request his majesty that no man be allowed to transport salt out of the kingdom; whereunto I most earnestly entreat you all to practise the discharge of the same.

"That no man take upon him to use this kind of husbandry without licence from the said Archibald, or his deputies, under the pain of ten shillings to be paid him for every acre of land they labour therewith, as well grass as corn, conform to his gift granted thereupon by his majesty." *

We thus see, that with whatever romance the scientific powers of our philosopher, and the members of his gifted family, may have been seasoned, those powers were not lost in the mazes of superstition, nor did they evaporate in vain attempts to work by magnetic sympathies, or to discover the secrets of Hermes. "The King of Tunis, invaded by a powerful enemy, promised to a neighbour who assisted him, the philosopher's stone. He sent a plough, terming it the philosopher's stone, because it would produce rich crops, to procure gold in plenty;" † and the secret, which Merchiston thus ably communicated to the country, might have done more than the immortal elixir for Scotland, by infusing a spirit of practical improvement, and new agricul-

* *Archaelogia Scotica, or Transactions of the Society of Antiquaries of Scotland*, Vol. ii. p. 154. "This curious paper is given from a MS. in the Archives of the society, which appears to have been taken from the printed copy [printed by Robert Waldgrave, printer to his Majesty]. This, it is supposed, is extremely rare. Neither Ames nor Herbert seem to have known any thing of it.—EDIT."

The late Lord Napier states in his MS. genealogical collections, "the compiler laments his being unable to give any account of the mode in which the salt was used,—never having been so fortunate as to meet with the printed exemplification of the patent." I have not been able to discover a copy either, and am indebted to Mr Macdonald, one of the Curators of the Scottish Antiquaries, for having pointed out to me the above reprint of it in their Transactions. The date of the tract as given there is 1595; but the register of the privy-seal shows that this must be a mistake for 1598.

† Kames.

tural hopes throughout a land devastated by wars, and disheartened by famine. When we consider the glad tidings brought to human knowledge by the promulgation of logarithms a few years afterwards, it is doubly interesting to contemplate the fitful rays which from time to time were shooting from the rude tower of Merchiston, across the whole horizon of the arts and sciences. Nearly two centuries and a-half have passed away since this agricultural essay was composed in the midst of the darkest ignorance and distress pervading Scotland. Yet, both in the practical knowledge it displays, and in the style of composition by which it imparts that knowledge, we would even now fearlessly submit it to the most hypercritical consideration of an age rejoicing in a Board of Agriculture.

The application of common salt to this important purpose was a discovery by no means obvious, or one easy to practise when discovered. Upon a cursory investigation of its properties it is apt to be rejected, or, at least, to be used so sparingly as not to afford very striking or extensive benefit; and it was not without reason that Merchiston laid down such special rules for the management of his system. Lord Kames, in his "attempt to improve agriculture by subjecting it to the test of rational principles," observes, "Salt is powerful; and an overdose of it does more mischief than of any other manure. It is soluble in water, and by that means enters the mouths of plants. Its effects, then, must be the same with that of lime-water; and, considering how sparingly it ought to be laid on land, it is not obvious what other effect it can have."* Now we will venture to say, that the Merchiston method was founded upon a deeper knowledge of the experiment than this; and that had his Lordship read the tract of 1598, he would have paused longer upon the subject. Since his time, experiments have been instituted which go to prove, not that such a system is futile and founded on unscientific principles, but that it is one requiring extensive practical knowledge in the management, and which even now demands a more thorough investigation. This will appear from the following observations contained in a work published under the auspices of one who deserves to be called the Genius of Scottish agriculture.

"Much has been said as to the utility of salt as a manure; but many doubts are still entertained on this subject by respectable agriculturists. From its well known antiseptic quality, it would at first sight appear not a very

* The Gentleman Farmer, &c. by the Honourable Henry Home, Lord Kames, one of the Senators of the College of Justice. Sixth Edition, p. 385.

likely substance to be beneficially applied as a manure; but, as it has been found to possess a contrary quality, and act as an assistant to putrefaction when used in small quantities, it may in this way prove useful by preparing the food of plants, from suitable substances contained in the soil. Indeed, the most generally received opinion, among those who recommend it as a manure, seems to be, that it serves vegetables in the same way it does animals, *i. e.* rather as a condiment or promoter of digestion than as affording them nourishment from its own substance. Numerous experiments have been made to ascertain its effects as a manure, but few of them have been productive of favourable results, and of these few the generality seems only to place it among manures of an inferior class. In one case, however, its effects appear to have been eminently conspicuous. The case here alluded to is a series of experiments made by the Rev. Dr Cartwright, for which he obtained the gold medal from the Board of Agriculture. Having laid out twenty-five lots or beds, forty yards long and one broad, he planted each of them with a single row of potatoes after manuring them all differently; and, after carefully and accurately stating the different appearances in all the different stages, and placing in regular succession each lot, with its produce in weight opposite, he found the preference due to a mixture of salt and soot, while plain salt occupied the sixth place; so that in this instance there were no fewer than nineteen manures inferior to it in the scale of public utility; and in that list were malt dust, fresh dung, and lime. A result so favourable undoubtedly calls for further trials, particularly with the soot mixture, which, if found uniformly successful, would be of considerable advantage to farmers in the vicinity of large towns. A discovery has recently been made in America, that salt is an excellent manure for flax. The quantity of salt should be double that of the seed used, and should be sown at the same time. Carrots also grow well in a salted bed, the salt being laid under the surface, in the centre of the intervals between the rows, and at some distance from the roots, that it may be dissolved before the fibres of the roots reach it." *

The paper to which Sir John Sinclair refers in the passage quoted above, is to be found in the fourth volume of Communications to the Board of Agriculture, and seems to stand very much in the same relation to the Merchiston

* General Report of the agricultural state and political circumstances of Scotland. Drawn up for the consideration of the Board of agriculture and internal improvement, under the directions of the Right Hon. Sir John Sinclair, Bart. the President. 1814. Vol. ii. p. 541.

method, that the experiments of Buffon and Peyrard bear to the catoptric propositions of our philosopher's secret inventions of war. As Descartes treated the burning mirrors of Archimedes, so did Lord Kames the virtues of salt, by entertaining the subject with brief scepticism, and dismissing it without experiment. It is much easier to find a plausible theory against the success of an improvement, than to institute experiments, or to mature a system requiring scientific skill in the management; and, accordingly, Lord Kames, and those who held his opinion, were not likely to be contradicted by ordinary practical farmers. Dr Cartwright, with the scientific independence of a Buffon, commenced experiments on the subject in the year 1804, the general results of which were as stated above by the president of the board. These results are very ably communicated in what the author entitles "An experimental Essay on Salt as a manure, and as a condiment mixed with the food of animals; sent in claim of the premium offered by the board, and to which essay the gold medal was adjudged."

It is interesting to observe, considering the vast difference betwixt the state of knowledge in their respective ages, how well the Merchiston paper can stand a comparison with this prize-essay of the nineteenth century. "Were," says Dr Cartwright, "the beneficial effects of salt as a manure to be once fairly ascertained, there can be no doubt but that the wisdom of the legislature would devise some means by which, without prejudice to the revenue, the farmer might apply it to the purposes of agriculture. At present the use of salt as a manure is a subject on which the public opinion is much divided; its advocates, reasoning from the striking effects of salt-water on the marshes which are occasionally irrigated by the sea at spring tides, conclude that the fertilizing virtue of such irrigation is owing to its saline quality, without taking into consideration the quantity of animal and vegetable matter which sea water, (particularly near the coast, and where rivers disembogue themselves,) must necessarily hold in solution. Those who maintain a contrary opinion, considering salt merely as an antiseptic, satisfy themselves that it is impossible that any thing can be friendly to vegetation which retards putrefaction; a process indispensable in substances that are to be the food of plants. To get over this difficulty it has been conjectured, nay, there have not been wanting those (and of great name too) who have even attempted to prove, that salt in small quantities accelerates, as in large quantities it is known to resist, putrefaction; a doctrine, to which, however, I shall not willingly yield my assent till I can

be persuaded that effects are not, in all cases, proportional to their causes. The operation of every cause is and must be uniform; and when to appearance it is not so, some other cause obtrudes itself, too subtile for our observation, which, operating at the same time with the primary cause, joins in giving a result, which, not being able to account for, we consider as anomalous. That theorists should be at variance with each other is not to be wondered at, for, having the wide field of imagination and conjecture before them to expatiate in, it is reasonable to conclude, indeed it is unavoidable, that some of them must lose their way. But what shall we say to the disagreement and inconsistency which prevail on this subject amongst practical farmers? Nothing, indeed, can be more contradictory than the different reports that have been made on the effects of salt as a manure, by those who have even brought it to the test of actual experiment. As there is no reason to question the veracity of the reporters, we must look for the grounds of their disagreement in some predominating circumstance or other, which at the time escaped their observation. Indeed, the success or failure of an agricultural experiment depends so frequently on causes which can neither be controlled nor foreseen, and so foreign from those which were expected to operate, that it is not to be wondered at if the repetition of the very same experiment gives oftentimes a different result. As it is not the business of this paper to support a theory, but to detail what has been practised, not to contend for an opinion, but to state facts, the few observations which may be hazarded will be such only as are required merely in explanation of occurrences as they arise. I shall endeavour to give, therefore, as simple a relation as possible of the experiments I have tried, to ascertain the advantages or disadvantages which may attend the use of salt as a manure, and also when mixed with the food of animals. It may be necessary first of all to premise, that the soil on which my experiments were tried is a ferruginous sand, brought to a due texture and consistence by a liberal covering of pond mud."

After detailing his experiments, and giving a minute table of their results, Dr Cartwright adds, " The foregoing table furnishes many particulars worthy of observation. In the first place, it is remarkable that of ten different manures, most of which are of known and acknowledged efficacy, salt, a manure hitherto of an ambiguous character, is superior to them all, one only excepted! and again, when used in combination with other sub-

stances, it is only unsuccessfully applied in union with that one, namely, chandler's graves, no other manure seemingly being injured by it." *

Thus much has been quoted from the highest agricultural authorities in Scotland, in order to place in its proper light to the general reader, the Merchiston scheme of the year 1598. What in our own times has obtained such consideration, and with such results, must not be regarded as a fanciful or crude proposal, even from one who lived when agriculture, as a science, could hardly be said to exist in Scotland; nor is it unimportant to observe, that this either forms an honourable exception to a harsh dictum of Dr Samuel Johnson *versus* Scotland, or serves to contradict it entirely. The giant of letters admitted, that "Literature soon after its revival found its way to Scotland, and from the middle of the sixteenth century, almost to the middle of the seventeenth, the politer studies were very diligently pursued. Yet, (added he,) men thus ingenious and inquisitive were content to live in total ignorance of the trades by which human wants are supplied, and to supply them by the grossest means. Till the union made them acquainted with English manners, *the culture of their lands* was unskilful, and their domestic life unformed; their tables were coarse as the feasts of Eskimeaux, and their houses filthy as the cottages of Hottentots. Since they have known that their condition was capable of improvement, their progress in useful knowledge has been rapid and uniform." † But Merchiston at least, even in the sixteenth century, was no den of savages. It is obvious, that the plan of tillage promulgated from that house had been matured by long experience, and anxious experiments, that all the difficulties and objections likely to counteract it had been foreseen and well weighed, and that the object of the careful instructions published was to neutralize the refractory qualities, both in salt and soils, which, perhaps, are the very causes of scepticism on the subject at this day. Whether that method be complete and of practical value to Scotland in the present state of her agriculture, is a question for the scientific. But the Merchiston tract deserves to be redeemed from the oblivion into which it has fallen, not merely as a page in the history of that family, but in order to obtain its due place in the annals of agriculture; and that, when gold medals are distributed,

* By the Rev. Edward Cartwright of Woburn. SAL SAPIT OMNIA.—*Communications to the Board of Agriculture, on subjects relative to the husbandry and internal improvement of the Country*, Vol. iv. p. 370.

† A Journey to the Western Islands.

in an enlightened age of plenty, for agricultural essays upon salt, the name of our philosopher,—whose farming operations were conducted in times of ignorance, turbulence, and famine,—may be honoured even by the Board of Agriculture.

Considering the terms of John Napier's letter to his father, quoted in a previous chapter, wherein he displays a minute acquaintance with country matters, and something like the habits of a farmer, we are much tempted to ascribe entirely to his teeming genius this method of enriching the land; especially as the profits of it were gifted to his son. But even if the plan originated with the old laird, whose active mind was certainly more than equal to the discovery, it cannot be doubted that it was matured and practised under the inspection and advice of the philosopher. It must have taken a series of years to afford the condensed information contained in the method as given to the public. During this time young Archibald Napier was pursuing his studies at Glasgow College, and in the year 1598 was only about twenty-three years of age, a time of life not likely to amass such practical knowledge in farming; nor is it improbable, as indeed his own expressions would lead us to suppose, that he had already joined the household of the king. An anecdote of his early history and habits will show yet more distinctly how far he was removed from the character of an agriculturist.

Patrick Galloway, the sturdy minister who alone of all the clergy, except the moderator, would venture on the mission with Merchiston to King James, had a son James Galloway, who was as little inclined to confine himself to the walk of a Scotch clergyman, as young Archibald Napier aspired to the habits of a philosopher. A close friendship had grown up betwixt these youths; and it is evident that the minister's son regarded his more fortunate companion with emulous, though not with envious eyes, and longed to equal him in his courtly career and attainments. About the commencement of their first ardent struggles for fame and fortune, and when both were little aware how high, and varied, and full of vanity their destinies were to be, James Galloway penned the following *morceau* to Archibald Napier.

"To the Right Worthie his much respected freind, Mr Napeir, gentleman of his Majesties privie chamber.

"SIR,—Upon the sight and approbation of those weall done peeces, which, before ye shew me, I confess my mynd was in some measure consenting to try sumthing in that kynd be way of imitation; for howsoever I did conceave the difficulty that might be in the performance, yitt wold I not give way to

any such surmise, not dreaming it to be any other then that which does ordinarly accompany all beginnings; besids, I hoped that the satisfying of this desyre of knowledge should, as it is in the appetits of the body, not only tend to the conservation of that facultie, bot even inrich it by this new growth of learning. Bot having made triall in one or two matters with such unhappy success as I am ashamed to relate, I fonde the supposed difficultie turned in a meere impossibilitè, and the desire to be bot a fals appetit, bewraying no stomak att all fitt for disgesting so strong and delicate a foode. Tharfore I had quyt given over the enterprise, and resolved, rather wyslie not to sett forward in this feeld, then shamefully be forced afterwards to retire; when behold, by the reading of your letter, I am on a sudden driven back to plunge again in that doubtfull deliberation, and how to rescue myself from the danger of this new assalt. For whyles I consider how plausiblie and insensiblie ye wold put the matter upon me, by acknowledging store of excellent matter and liberalitie in the bestowing of it att some occasions—how craftily ye insinuat the easiness of the practise, calling it bot a style simplie, obvious only to the inferior powers of our mynd, sense and imagination, a sauce of exterior grace, and bot a complement of vertue and learning—and last, how powerfully ye preass to persuade by the profitablenes to others and to myselfe, in begetting favor and opinion of meritt, and by the necessitie of ordering the conceptions and eviting of confusions—I must confess (to use your owne similitude) ye have so weall gilded the pills, and candied the drogs, that, if I had not tasted the bitternes and harshnes of the ingredients before, I should, without more adoo, have passed them peaceablie, and returned again into my first standing with fresh curage, by vertue of this new alarum. Bot when I look again more inwardlie into it, and, by a more exact survey, tak up the true dimensions, the depth of understanding, the hight of conceptions, the proportionable superfice in the style, with the pleasantness of the plantation through the whole, I must of force acknowledge, that the proportion is not fitt for my undertaking, not being able to fulfill the conditions. For an essay in my mynd is the name of a most ambitious practise; the word both importeth doubt and denyeth perfection; for he is properly said to essay, who endevoreth to doo that wharof the performance is doubtfull; and ane essay which, howsoevir it handleth the subject, yitt leaveth hope of forder dyving into the same, denoteth bot a spare and restrained triall. Wharfore, it might seeme that even a most barren spirit might, without suspition of self-conceat, labour his awne perfection in this kynd, and boldly enter these ambitious lists, under so

modest a mask to cover his pretensions, being able by the propriete of the word to excuse his rash attempt, if his meaning should be misconstrued and anyways wrasted to ambition. Bot whatsoever the word signifieth, sure ane essay, as it is usually taken, is a practising of a man's witt, or the wittiest practise of his witt, about any certain subject. A wittie practise it must be, since every practise of witt is not worthie this name; and a practise of witt I call it rather than judgement, since it must be more relevat, and have a hyer straine, then judicious solidness dois requyre; for, as in this elementar world the globe of earth and water, as most confused, is lowest,—the aire, as most temperatt, in the middle,—and above all, as most pure, is the fyer; so in the scale of our understandings, fixed by the temper of the elementar qualities in the organs, the knowledge of sens, as most confused and terreall, is the lowest,—that of judgement, proceeding of a moderatt and equal temper, hes and is the true meane,—bot witt, as most fyrie, transcending the rest by his active and searching heatt, is placed in the highest degree. Whence it is that in this microcosme, the most majestuous state of nature, the sensuall and grossest understandings, as hir basest subjects, are, as least dangerous, so least exposed to danger, the middle sort of juditious, both the ways most secure, bot the wittiest, thogh hir greatest mignons, are both most perillous, by overreaching thair naturall prince with artificiall inventions, and also most obvious to the frownes of fortune by outreaching themselfes, being nixt to the precipice of folly, if not content to consist in the hyest. Since, then, (to return to my purpose) ane essay is a practise of witt, it must of force be juditious; for witt, being the last and hyest degree of knowledge, it presupposeth and includeth judgement, for witt is as it wer the subtill perfection of judgement, and judgement againe the moderation of witt. In a word, judgement must furnish the matter of this practise, for it must be juditious; bot witt gives it the forme in excellency and quicknes, and that not in any degree bot the supreamest of lyvely grace and proportion, whence I call it, of all the practices of witt, the wittiest. For in matter of essays, nothing that is meane can please no more than in poesie;

——— mediocribus esse poetis
Non homines, non Dii, non concessere columnæ.*

The ground must be juditious, the words choise, the steill tight, the illustrations apposit and cleare, all excellent and quick; bot which is the cheifest of all, and whence, as from the former, it must be thoght worthie of

* *De Arte Poetica.*

this name, is, that both the conceptions themselfes, and the manner of couching them, must not be ordinarie: for it is the perfyt portrait of the mynd, and may fitly be compared to that of the bodie, whois excellency dois not consist in the choisnes and variete of colours, or in the cleanlines and delicacie of the draghts, or yitt in the exact proportion of every member to another, and of the whole to the dimensions of the body, but it must have that lyvelines of representation answering the conceaved idea in the imagination of the artificer, and the treuth of the person, so as there seem nothing to inlaik of lyfe bot motion. Now, to poynt out formally wherin this formalitè dois consist, I must of force use that ingenuous word of NESCIO, thinking that to be the best expression that I can make of it, that I cannot expresse it; yitt, least my apologie should not be sufficient, in being as it were afraid of a thing I know not, the reflexion of the brightnes of those peeces which I have seene, will afford some glance to leade me by the threed of similes and negatives, unto the outgate of this laberinth wharin I am so obscurely involved.* For negatives, I have said that the conceptions and couching must not be ordinary, that is, that they must nather be too obvious nor too far soght, and, as it were, wrested to the purpose *a contrepoil*; and this naither too spair and restrained, nor yit too large and dissolute, both not affectat, bot naturall and naife, and all both furnished and flowred with quicknes of invention; for it is lyk that grace that showes itself in the pleasing and delightfull variete of colours springing up in sundrie places in good order, one after another, in this pleasant garden of the mynd; or it is the excellency and comlines of the project of this hir stateliest pallace, consisting both in the plot of the whole, and proportionat contryving every roome, and therin placing conveniently these entrys of invention and lights of cleere elocution, besids the preciousnes of the materialls, the rarete and excellency of the workmanship, and the richnes of other furniture belonging therto. And, in a word, since I am driven to ane end, it is that *true golden tincture*, without the which al the rest will prove bot counterfitt; and, being broght on, dois shew the inestimable riches both of the peece and the possessor.

" Now, Sir, I hope ye have seen really what before in words I protested; for heer ye may sie ane intended essay of myne, bot so defective, that it cannot express that part of itself, without which it can not enjoy that name; how much more to illustrate or sett forth any other thing in that kynd; wharfore, Sir, I am sory that your both honorable and profitable conclusions should not have thair premisses in me, and that your so wholesome and restoring drogs

* This is very like what some wags call a speech upon the general question.

should not have bredd some lyvely sprits for performance in this kind; and not, as now it is, (such is the distemper of my stomach,) turned them in complementall persuasions, only fitt to begett and nurish fekles and courtlie hopes, whare ther is no reall probabilitie. Wharfore, I must returne them all upon yourself, whois richnes in thes possessions doth appeare in your neglectfull and lavish spending, and demonstrat my povertie more than sensibly; for you having intended bot a letter, have expressed a perfyt essay, such is the fruitfulnes and obsequiousness of your quill; bot I, having intended to sett downe ane essay, have scarce given you the say of a perfyt letter; so hard it is to performe any thing *invita Minerva*, and am in this, lyk that unskilfull potter with whom

——— amphora cœpit
Institui: currente rota cur urceus exit? *

Now, Sir, in retribution of your frendlie and verteous advice, since I sie your mynd sett to draw some man in to his disadvantage, my advice is, that ye dissemble a litle your play in the beginning, least ye seeme both too avaricious in not contenting yourself with the richness of your own possessions, and too courtly and crafty in cunnicathing others, who perhaps will not so willingly, according to the law of armes, yeeld as I doo myself, by right of conquise,

Your most obsequious and loving servant,

"JA. GALLOWAY."

And what is this, the reader may perhaps exclaim, and what does it portend? "'Marvellous fine words, neighbour Happer, are they not?' 'Brave words,—very brave words,—very exceeding pyet words,' answered the miller, 'nevertheless, to speak my mind, a lippy of bran were worth a bushel o' them.'" Shade of Sir Piercie Shafton, this is EUPHUISM! Archibald Napier had worshipped at the shrine of John Lylie, and the minister's son was his pupil. "Ah, that I had with me my anatomy of wit,—that all-to-be-unparalleled volume,—that quintessence of human wit,—that treasury of quaint invention,—that exquisitely-pleasant-to-read, and inevitably-necessary-to-be-remembered manual of all that is worthy to be known,—which indoctrines the rude in civility, the dull in intellectuality, the heavy in jocosity, the blunt in gentility, the vulgar in nobility; and all of them in that unutterable perfection of human utterance; that eloquence, which no other eloquence is sufficient to praise; that art, which, when we call it by its own name of Euphuism, we bestow on it its richest panegyric!" †

* *De Arte Poetica.*

† *The Monastery.*

The above letter, which bears no date, is obviously written about the close of the reign of Queen Elizabeth, or the commencement of that of James in England, when the most *recherché* literature were the works of Lilye. To these "'tis said our nation was indebted for a new English, which the flower of the youth thereof learned,—when all the ladies were scholars to them and their author; and that beauty in court which could not parly Euphuism, was as little regarded as those now there that cannot speak French."* The ambition of James Galloway was not entirely disappointed. He was knighted, became master of requests to James VI. and Charles I., a privy-councillor, and conjunct secretary of state with the celebrated William Earl of Stirling. At length, in the year 1645, he was elevated to the peerage by the title of Lord Dunkeld, and is now chiefly remembered as having been numbered among the prophets. Sir Walter Scott possessed a curious manuscript, appended to the rare edition of "The whole Prophecies of Scotland, &c. printed by Andro Hart, 1615;" the first item in which manuscript is entitled, "a prophesie, whereof Sir James Galloway, predecessor to the Lords of Dunkell, was *called* author; others ascrybe it to Napier of Merchistoun, the famous mathematician, first Lord Napier."† But among the papers of the philosopher's son (who was first Lord) I find an old copy of those very prophecies, entitled "the prophesies of James Galloway, Lord Dunkeld, before the troubles in England," to whom, therefore, the merit must be ascribed. Though our Euphuist succeeded in obtaining such lofty places, both in the Court of Apollo and of King James, yet, like Sir Piercie Shafton, the thorn of a less gentle origin rankled in his side, and it was upon the occasion of his elevation to the peerage that some English courtier exclaimed, "the king can make a peer, but he cannot make a gentleman." Lord Dunkeld's

* *Anthony a Wood*, who gives the following account of the author: "John Lylie or Lylly, a Kentish man born, became a student in Magd. Coll. in the beginning of 1569, aged 16, or thereabouts, and was afterwards, as I conceive, either one of the demies or clerks of that house; but always averse to the crabbed studies of logic and philosophy," &c. He became a noted wit in the Court of Queen Elizabeth, and unjustly celebrated for many ridiculous works, especially *Euphues and his England*, and the *Anatomy of Wit*, first published in 1580 and 1581.

† This MS. consists of nine leaves, and bears the general title, "Prophesies collected from other authors; some whereof knowen, and ther names affixed; others not knowen, but many of them old and currant through the isle of Great Britain; collected and faithfully written by John Gordon of Tillichondie, anno 1711." A copy of this was taken for the Advocates' Library; it varies slightly from that among the Merchiston papers, and the contents are so silly as obviously not to have proceeded from John Napier.

Jamieson. From the original in the possession of the Lord Napier. R. Bell

Yo^r Ma^s humble and obedient
subject & servant.

Archibald Napier.

early companion and instructor, with whose agricultural celebrity this chapter commenced, thought no more of his paternal acres than how to spend them most handsomely; but to his career and fate we shall have occasion briefly to recur.

The philosopher was justly proud of his eldest son, who never gave him a moment's uneasiness, unless, perhaps, from the expense he incurred at the court of an avaricious monarch. But John Napier's studies were sadly interrupted by the wild doings of other members of the family, and the more so, as Sir Archibald constantly looked to him for advice and assistance in all domestic difficulties. The double marriages of both father and son had extended the family connections far and wide,—to the Bothwells and Bellendens, the Mowbrays of Barnbougall, the Stirlings of Keir, and the Chisholms of Cromlix,—all families prominent in the stormy history of the times. But the family circle itself consisted of upwards of twenty children and grandchildren, twelve of whom appertained to the philosopher; and nearly all had passed their childhood before the close of the sixteenth century. The house of Bradwardine had but one rose, but Merchiston had many; and Osbaldiston-Hall itself did not ring with wilder gallants,—with warmer hearts, hotter heads, and hastier hands,—than the younger sons of "Sir Archbald Naper of Edinbellie, Knycht."

The very antipodes of Euphuism in those days was the chivalry of the borders,* that extraordinary melange of generous daring and predatory meanness, the characteristics of the noble and the base. The philosophic repose of Napier must have been not a little disturbed by various events, which brought his brothers and other members of the family into tragical connection with the habits of this rude chivalry. Francis Mowbray, the brother of Sir Archibald's lady, was the sworn friend and intimate companion of Sir Walter Scott of Branxholm and Buccleuch, warden of the west marches; and this Francis, as brave and wild a youth as the times produced, was the mirror in whom his nephews, the philosopher's younger brothers, chose to dress themselves. It was upon the 13th of April

* "I well remember," answered Christie of the Clinthill, "that at the race of Morham, as we called it, near Berwick, I took a young southern fellow out of saddle with my lance, and cast him, it might be a gad's length from his nag; and so, as he had some gold on his laced doublet, I deemed he might ha' the like on it in his pocket too, though that is a rule that does not aye hold good. So I was speaking to him of ransom, and out he comes with a handful of such terms as his honour there hath gleaned up, and craved me for mercy, as I was a true son of Mars, and such like."—*The Monastery.*

1596, that Buccleuch performed his unparalleled feat of storming the Castle of Carlisle, and rescuing from thence that king of thieves, "Kinmont Willie," who had been treacherously captured on the part of the Queen of England.

"Now, sound out, trumpets," quo' Buccleuch,
"Let's waken Lord Scroope right merrilie!"
Then loud the warden's trumpet blew,—
"*O wha dare meddle wi' me.*" *

On the following day, Francis Mowbray, who no doubt had some hand in the above enterprise, meddled with one William Schaw to the effect of running a rapier through his body, for which slaughter he was outlawed. † About the very time the old feud betwixt the Scotts and the Kerrs was raging, to the disturbance of the peace of Edinburgh, and Francis Mowbray was second to Buccleuch in a contemplated combat betwixt him and young Kerr of Cessford. All Scotland, including the monarch, were proud of the storming of Carlisle, which so deeply wounded the pride of Elizabeth; but, in order to afford her some slight satisfaction, Buccleuch was confined in the castle of St Andrews, "under pretext of intercomoning with Frances Mowbray, (fugitive for the hurting of William Schaw,) and making him his secund in a combat undertakin betwixt him and young Cesfuirde."‡ From a letter to Anthony Bacon, dated from Edinburgh, 23d November 1596, it appears that this feud had been stayed, and that the parties, including Mowbray, joined themselves in a close league and contract with the Popish lords and their confederates. The parties to the league were, "the Lords of Hume and Sanquire, the Lairds Cesford, Baclugh, Clasburn, and Kirkmighil, with all the rest of their assistants in those parts, who not only subscribed, but swore to follow all one course in whatever should be undertaken by any one of them. This contract, by a general consent, was given to Francis Mowbray to be kept, by whose means (says the letter writer,) I had the sight of it; for he would gladly have dealt with my lord embassador concerning a plot that he had devised for alteration of the state of these Octavians; the which, as I understood, should have been effect-

* Robert Birrel notes, that Buccleuch did it "with shouting and crying and sound of trumpet, puttand the said toune and countrie in sic ane fray, that the lyk of sic ane wassaledge wes nevir done since the memorie of man, no in Wallace dayis." His date is the 6th of April.

† "The 14th of Apryll, Mr William Schaw wes stricken throw the bodie with ane rapier, be Francis Mowbray, sone to the Laird of Barnbougle."—*Birrel's Diary.*

‡ Moysie's Memoirs.

SALEX R NA
PEIR SONETO
S ARD OF MER
CHIMSTOVNE
HIS CELESTI
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1.50 ♒
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4.12 ♌
18.22 ♑
25.17 ♒
24.53 ☿
8.7 ♃
15 ♑
15.39 ♏
14.55 ♏
18.29 ♐
22.57 ♐
4 12 ♍
10.52 ♑
4 30 ♈
15 39 ♌
21
25 44 R ♈
23.47 ♈

ed by those persons aforesaid. For, said he, these are wise men, and will seek their advantage, either by the Queen's Majesty of England, or else by the King of Spain. And if this offer of their service take not effect, or be not embraced of the English, they will take their vantage of the Spaniard. But because of a promise that my lord made to the king, that he wold in no sort meddle with Francis, he refused to deal any farther with them, save only that he had the sight of the contract, which I brought him, because I was the traveller between them, requested thereto by Francis, with whom I have been in great friendship this great while, and am yet. Now I understand that he is a special doer for the Earl of Huntley; and my Lord Sanquire, who is the chief man in the foresaid league, hath had sundry meetings with the Papists, and now is become a great courtier; so that this makes great appearance to affirm that which I say, yea more than this, my Lord Sanquire is to be excommunicated, because he can in no wise be brought to subscribe to the religion." *

Shortly after this, Mowbray went abroad to the Low Countries, (where his sister Barbara was mourning over the relics of Queen Mary,) and, attaching himself to the court at Brussels, became deeply involved in all the Popish plots against which John Napier entertained so pious and patriotic a horror.

Alexander Napier was the eldest son of Sir Archibald and Elizabeth Mowbray. He was born in the year 1572, under certain conjunctions or aspects of the planets, which were carefully recorded, and are still preserved. Even a century after this date judicial astrology was almost universally believed; and, if it was our philosopher who cast the horoscopes of his family, he only performed a task which in those days it would have been undutiful in him to have refused, supposing him acquainted with the celestial science. We shall not attempt to read the scheme here presented to the curious reader; but, certainly, if they contain not "fiery and airy masculine signs," those twelve houses were not erected by the hand of a master. Besides Alexander, there were other two sons of the same marriage—Archibald and William. These three brothers were of restless turbulent dispositions, giving great uneasiness to their parents, and to the philosopher, who seems to have been regarded by them rather *in loco parentis* than as a brother. It appears that Alexander and William, some time before the year 1600, were exceedingly anxious to join their wild uncle, Francis Mowbray, abroad, and sought various pretexts for doing so, contrary

* Letter in the Lambeth Collection. See it referred to, *supra*, p. 280.

to the wishes both of their father and mother. Archibald, though just of age in that year, was a married man with a family, but not at all settled or sobered on that account. His sword was as seldom in its scabbard as he was in his own house of "the Wowmet," with his young wife "Alesoune Edmeistoune," and their infant daughter. He was ever riding to the hills or the borders, like a knight-errant in search of adventures; or, to use Lindsay's mode of characterising Sir Archibald, "as gif he war ane pursuivant." He seems, however, to have been a generous high-spirited youth, the Mercutio of his family, and it was matter of deep distress to them all when these wandering and warlike habits brought him to an untimely end.

The Scotts of Bowhill were a younger branch of Scott of Thirlstane, a cadet of Buccleuch. Satchells, in his doggrel history of the name of Scott, dedicated to James Scott laird of Bowhill, in 1686, says,—

> "Thy father Robert, yet survives;
> Thy goodsire was by the Napiers slain;"

a verse recording an incident, of which the particulars have been hitherto unknown to modern readers of border history. About the period of the Gowrie conspiracy, which happened in August 1600, young Archibald Napier chanced to be somewhere in the border country, and while in the act of searching for his horse, stolen or strayed, he met Scott of Bowhill. This moss-trooper, taking some questions on the subject of the missing quadruped as a personal affront, told Napier to defend himself or die. The latter did all that he could to avoid the quarrel; but Scott, having waylaid him that same evening in a lonely spot, again defied him, when they fought, and Napier killed his pertinacious adversary. There seems to have been nothing unfair on the part of the successful combatant, nor was any attempt made to bring him to justice; but upon the 8th of November 1600, the brothers of Bowhill, with others of the name of Scott to the number of six, with the addition of Thomas Crichton, a cadet of the house of Sanquhar, waylaid the unfortunate youth as he was riding alone, under cloud of night, to his own house in the neighbourhood of Edinburgh, and put him to death with many wounds, very near the palace itself. This, even in those times when such tragedies were of daily occurrence, created a great sensation, and was considered a very horrible murder. Sir Archibald Napier went in person for redress to King James, who expressed the strongest indignation against the perpetrators, and declared, that he would as

soon forgive the Gowrie conspirators as the murderers of Archibald Napier. That fearful attempt upon his own person, with which the whole country was then engrossed, happened only three months previously; no stronger expressions could have been used, and this of itself is sufficient to show that Archibald Napier was not considered as having justly paid the penalty of his life to the brothers of those he had slain. Alexander seems to have been very much excited by the murder of his brother, and both he and William proposed some dark scheme of revenge by which they should have blood for blood. This had been seriously urged by them to Sir Archibald Napier and the philosopher; and when their meditated revenge met with nothing but rebuke from that quarter, these hasty youths wrote to their father, declaring that they felt dishonoured in their own country, and must quit it. Sir Archibald endeavoured, with the assistance of his eldest son, to bring these prodigals to a sense of their evil ways by the most earnest admonitions. The letters composed upon this tragical occasion, apparently by the philosopher himself, are exceedingly powerful, and present a very curious picture of the times. The following is unsigned, but seems to be in the handwriting of John Napier, though somewhat hastily written, and afterwards to have been rejected for another written on the same day, and signed both by himself and his father.

"SONEIS,—We greit you with sick commendatiouns as your folifull deid deservis, be ministering unto us new occasioun of gritter displessour. Ye lament onlie your brothir's deid, but we lament bayth heis deid and your foleis, and the mair, that as he wes in his tyme uncounsalabill, sua ye appeir to follow the samyn cours. God mak ye end better. We haif ressavit your lettre, or rather your fuillische gudenycht, be the quhilk ye wald bring upoun us the occasioun of this your vane interpryse; allegeing us to be slak in the revengeing of the lait injurie done be our enemeis, sayinge ye proponit dyvers wayis to haif repairit the wrange done, bot we wald nawyis prosecute your devices, bot objectit in the contrair. Judgement, wit, and experience craveis ressouning in materis of grit importance befoir conclussioun. Gif we had fund your devices possibill, we culd esilie agreit to the samyn, bot being so heiche, thai passit the reiche of our power, though we had bene twentie tymes gritter of power, rank, and rent nor we ar. We behuiffit to ressoun and oppone aganes unpossillitie, not leiffing of in the meyne tyme sick possibill preparativeis as the

tyme and occasioun offerit. Bot this your proceidingis declairis that ye haif taikin up this our slaknes, as ye tarme it, to be bot onlie ane pretext of your uncumlie and dishonorable doinge; for we knaw that this lang tyme, the yeiris past, ye bayth hes bene of this purpois; and sua justlie ye can nocht pretend the lait deid done to be the occasioun of your auld foliche intentioun; nather yit can ye justlie burthing us with ony strait deilling towardis you, for we war contentit at all tymes that ather of you suld chuis, quhom ye pleissit best, ane wyfe of honorable parantages, at quhilk tyme we suld extend our gude will to you and hir on sick maner as, justlie, ye nor the frendis of hir suld haif na occasioun to plent; we ressavinge ressounabill meitting; bot propone or do quhat we culd, all for nocht, except we wald haif giffing gritter rent and landis to you nor our power mycht extend to; and that onlie to your selffis to play the ryote with, and nocht to be ussit as we haif said befoir. Alexander! ye knaw that ye wer nocht provydeit be birthe, nather to landis nor rent, and yit God of his mercy, be the providence of me and your *dolorous mother*, hes obtenit ane ressonabill leving to you, (gif sufficience wer contentment,) quhilk we culd nocht haif done, togidder with uthir turnes we haif done, gif we had playit the ryote, as ye wald. Thir thingis set apairt, we haif thocht gud to lay befoir your jugments, honour and dishonour, prosperitie and povertie, lyfe and deithe. First, quhat sall it be said bot for feir and febilnes ye haif left the cuntre, feiring to fall in the handis of your enemeis! Secundlie, beleiffis ony of you to obtene in uthir cuntreis sick roumes and rent as ye haif appeirance heir to? bot in steid of seiking a gritter, sall lois it that ye haif; heir tyneing your selffis be opponing you to unnecessar dangeris of your lyffis; or at the leist to fall for laik of interteinment in miserable povertie! and than ye will say, ye wald wis to God that ye had followit the counsell of your parentis and freindis, rather than nor the wilfulnes of your selffis. Bot, allace, we feir that your repentance sall than cum too lait, quhen nather counsell nor assistance of freindis may help. Heirfor, leif off, in Godis name, sick vane interpryises, and apply your-selffis to wyis counsell, traisting the assistence of Godis spreit to concur with you in your proceidingis; and be nocht as the foirlorne sone, leist your fatheris be nocht nor may nocht releif you of your calamiteis. Gif ye will nocht lief of sick foliche interpryses, we draw the heavin and the eirthe, and the name of our grit God, to witnes, that ye ar the occationeris of your awin perditioun, in respect

of the gude will and luif that we beir unto you, gif we fand you counsillabill; quhilk gif ye be nocht, think nocht to eschaipe the heavie hand of the Lord. And quhair-as ye write of my thre sones and my oy, that the exspectatioun of that raice concistis onlie in the barne that is yit unborne! * think it is litill of Godis mycht to rais of the dust childrene to Abraham; and thairfoir be nocht of that opinioun that we will die without airis; nor be nocht the prouder that we had rather ye wer our airis nor utheris; for we dout nocht in the mercie of our God to haif sick as salbe to our comfort, beit ye or uthris at heis plesour. Thairfor embrace our loving counsell towardis you bayth, for your honouris and weill; and ground your selffis rather, than, upoun God nor upoun vane inventiones; uthirwyis, as said is, we protest befoir God ye ar the causseris of your awin distructeris, and we innocent of the samyn. Ye write tuicheing the provydeing of ane servand to everilk ane of you! I beleif it to be nocht sua schortlie past out of your memorie quhat wes your lait answer tuiching *Frances Mowbray*. This for conclusioun, humbill your selffis to your God, returne to us your parentis, and be nocht eschameit, but rather repent in tyme nor ower lait; utherwyis we protest before God, that we ar fre of your blude cum quhat sua may heirefter. Sua committis you bayth to the governament of the Spreit of the Lord. At Merchingstoun the last day of November 1600.

" Be your loving parentis."

As the handwriting of this letter, though similar to that of the philosopher, varies from it in some respects, it may possibly have been written by Sir Archibald himself, and rejected for the following, which, unquestionably, is all in the handwriting of John Napier, and from the subsequent part of the correspondence it is obvious that the philosopher was chiefly regarded as the Mentor upon this unhappy occasion.

* This must refer to the family of Sir Archibald's second marriage only, (in the name of whose parents the letter is written,) otherwise the sentence is not intelligible. Of that marriage there were three sons, Alexander, Archibald, and William. Sir Archibald mentions in the will " Helen Naper, my oy (grandchild) dochter to umquhile Archibald Naper my son." Alexander probably had threatened his father with the loss of heirs-male of the second marriage. Of the three sons two were unmarried, and one murdered; the " oy" was a girl; the " babe unborn" was the chance of Aleison Edmonstone having a son.

" SONIS,—Efter our commendationis, we heff recevit your letter concerning your onorderlie depairting furth of this cuntrie, the breif soume quherof semis to be, that ye imput the haill wyt and occasione of your saidis depairtouris to our defaltis, that ar your parentis, in that we nather aggrie to ony of your plattis, nather proponis other mair solid coursis of ouris awin for the reveng of the lait horrible murthour of your bruther, and that ye can nocht comport, for schame thereof, to remaine in the cuntrie. For answer hereto, althocht sa war that we nather can (for just occasionis) agrie to your coursis theranent, nather, as yit, will conclud by our selfis alanerlie upon sa wechtie ane caiss that concernis hous, haill name and frendis, without we first convein our frendis to that effect, that thair deliberatioun also may be had theranent. Is that smal delay ane argument that we mynd to overpass that matteris with sylence, and not rather to provide with diligens, conforme to the commone consent and conclusione of frendis? Bot put the caiss it wer sa, is that the occasione of your oncumlie depairting? nay surlie, altho ye mak it the only pretext thereof, for it is knawin to God, to the world, and to your awin consciencis, that this lang season, befor the said slaughter and lett pretext of dishonor, ye heff socht all occasionis, pretextis, and causes ye culd, to heff departit away. We wold wisch you, in the feir of God, to behaif yourselfis mair plainlie and obedientlie to us your parantis than to be making sik pretextis to colour your inobediences, quherby ye do that in you lyis, to bring us, that are your parentis, to the graif with sorrow, as also to heipe on yourselfis the wratht of God therfor. Ye tak in mynd deiplie the reveng of the said murther! and na marvell, for sa do we all; bot quhy neglek ye the originall pairt of the tragedie? forgetting how your umquhil brother became ane inobedient and stubborn contemptnair of father and mother, depairting away at his awin hand, first to the north to fecht in ane ongodly causs,—syn to the south to procure his awin deid,—last out of the cuntrie;*—and other contempts nocht to be wrettine; for the quhilkis, that Lord that in his commandis promissis long lyf and inheritance to them that be obedient to father and mother, geff to him ane schort lyf and ane tragicall end, to all our greiffis. Quhy heff ye nocht thir thingis befor your eis, to eschew the

* So it is in the original. But how, in the catalogue of his offences, there could be the item, of quitting the country *after* having procured his own " deid," *i. e.* death, is difficult to understand. It must mean, that, after fighting in the north, he went south, where the consequences paved the way for his own death; that, having killed Bowhill, he left the country for a little, and was murdered on his return.

lyk inobediens, that ye may haff the blissing of God and of your parentis by a long lyf and inheritans? and chusis rather to pass the way quherin otheris hes perisched, and quhilk will bring both you and us to decay. This we, upon fatherlie dewtie, can nocht lef on admonishing you of; desyring, therfor, you, both, upon your dewties and sonly obedience, both to cast off sik ongodly notions and temptations of rebellione against God and your parentis, and to returne haim to that obediens, that, be the law of God and man, ye ar bund to. Lyk as we your parentis sal leif na thing ondone to you that belangis to our dewtie, and though nocht as ye wald, yit as we gudly mey by the discretione of our wysest frendis, and estait of our effairs. Bot if ye wil not returne to the obediens and honor of your parentis, we tak God to witness, and thir presentis sal be a testificatione, that the wyt is not in us. Seing with Moses, Deut. 30, we call the Heaven and earth to record this day against you, that we heff sett befor you lyf and deth, blissing and cursing; tharfor chouss lyf, that both you and your seed may leif in the land. And sua praying the Almychty to inspyr your hairtis with a mair quyet and obedient spirit, we remitt and committis you both, to him and his protectione. At Merchistoun this last of November 1600.

" Be yours loving parentis,
" Sr. Arr. Neper.
" Jhone Neper."

This powerful appeal seems not to have been made without effect. A letter, addressed shortly afterwards by Alexander to his nephew Archibald, the philosopher's eldest son, indicates that the writer of it had become more reasonable, though the fate of his favourite brother still rankled in his bosom. It is also a most energetic and characteristic epistle.

" To the Richt Honorabel, my luvin Bruther,* Archibald Nepier,
Yunger of Merchiston, This,

" Richt Honorable and weil-belovit Brother,—Seing nather resone commandes, nor I of deutie acht to pretermit you in anie speciall erand, (cheiflie now quhan your father is movet nather to think I evir did him wrong, nor to do me injurie,) thairefoir I hev thocht expedient that ye suld knaw, the better

* Alexander Napier always addressed his nephew as his *brother*; probably from the habit of considering the philosopher as a parent.

that ye mey prevent, the inequitable petitione of the brother of Buhill, quho hes stired up the Lord Bacleuch to suit, be the mediatione of the Lord Sancher,* agriment betwix us and thaim; quha, in thair name, com to me with a paper conteining certan offers the quhilk to luik [at] I altogither did refuse; yet, efterhend, I resevit knawledg of the contents, to wit, they suld give us a thusand pund, and in all tyme cuming to be as brither! the quhilk offer dois so inanimat me with grit disdaine, that give it war for no moir bot for wilipending so our house and name, and so lichtlie accunting of all, that I resolve, God willin one dey to mak thame buy it dearer. Bot for answer to the Lord Sanchair, I schew him the matter acht not to be proponnet to me myne alaine, for thair was other frindes to be spoken, bot chiflie yourself, quhom God mey schortlie install in your father's place; † and I was ignorent how ye wald estem of that propositione, and weill assurit it war the redie way to banisch me from your guid consait give I suld attemp, yourself prettermittet in that erand. Quhilk answer he accepted, and went his way for the tyme, bot com efterward, and schew me that the sam had bein gevin befoir be my father, and wald hev aledgit be me; the quhilk I sed was niver given be me; than he desyret that I wald speik you, or writ to you, to heir of your mind; the quhilk to do I promiset, bot so I must do it as Regulus, quho being a Roman, captived at Carthag, was send to Rome to treit *de redimendis captivis*, quha gev cunsall in the contrair, and forbad the Roman senat to exchang the captives at Rome with himself, for he was auld, and they yung. So must I sey, thocht it be my quietie—as being neirest to the frunt of thir men's fid [feud]—to foirsei, and to tak hold of offeret peice [peace.] Yit, luving brother, niver imbrace dishonorabell agriment, for all is dishonorabell quhair thair is not eie for eie, and tuith for tuith; and as I think, God willing, nothing sall divert me from the sam; ye, [yea,] not the thing Lord Sanchar said. Schaw thame give ye will or not agrie, that give not, thay mey do for themselvis. The feir I hev they deill be the cunsall, or be his majestie, freyes me; yit it must not divert me from the deutie of a luving brother, of a myndfull man, quhom God in his word hes, as he hes meid us beith the revengers of bluid, and thairfoir suld seik justice; the quhilk give ye find no good meins to obtein, yit I hartlie pray you to delay the contrair, and go to his majestie, ernestlie asking promise of him nather to give respet for long or schort time, nor remissione; quhilk I assur me he

* The noted Robert Lord Sanquar, who was hanged in 1612 for the murder of a fencing-master

† The Logarithms were not published until fourteen years after the date of this letter.

will niver denay to you, give ye put his heines in mynd that he sweir to my father, that *as sone suld he remit the tresone of the brither of Gowrie as that fellonius murther*;* quhilk his majesty detesting quhen it was acted, did agraig, eiven out of his awen consideratione, that it was done in tyme of his heines Parliament,—hard by his palace,†—under clud of nicht,—on foirthocht felloine,—be the number of seven, airmed with suird, speir, and pistellettes,—with quhilks all he was slaine, being a young man not twentie-twa yeirs, and for no moir cause bot that he defendet himself against the furie of their brother, quha persuit him in the bundes quhair he niver had travellet in his lyf of befoir, and that for aledging of a horse to bein stollen out of the house of the mure, quhilk he demanding give he had sein aine lyk to it, tokens being all tauld, presentlie was mistaken be the other, quha neid wold hev him ather defend or dei; quha, for that tyme, chuset rather to leive him alon; bot the other lay all day in wait of him in the way, and at the evning focht him in the stret of the gait, betwix low dykes, quhair he culd not flei. I hev in lenth tauld this knawen storie to you, that ye mey mynd his heines of it the better, and beseik him at leist to give no remissione to the murthearers of our brother; and to mak moyan to get the cunsall forbiden from medling with the sam, because it was so detestable and hynus a wrong. I hev written to my Lord Dingwall for the sam cause, quhois aid give ye think guid to use, I am suir it will not be the worse for his defalt: alwayes as likes your wisdome to procid. So do I prey you, and do for boith your awen and my honor; *bot cheiflie for the remimbrance of him, quhois curaguis luve wald niver lyne so long idill in ather your or my erand.* And let me be advertisit be sum suir meines; not be ye paket, nor no common passenger. I neid not intreit for this at your hand, and tell you that I am yours in anie thing I can; for thairof ye niver neidet dute [doubt]; so God me saine, to quhom I prey for you.

"ALEXANDER NEPIER."

* This shows what a miserable creature James VI. was. He dared not fulfil his own solemn promise to bring murderers to justice.

† Slaughter near the king's person was in that reign a dreadful aggravation, even of murder. William Bikartoune of Casch was brought to trial for wounding George Auchinlek of Balmanno, at the "*stinkand style*" of the burgh of Edinburgh. But the chief point of dittay was, that this was within three quarters of a mile to the king's person. The jury found the pannel guilty of the assault, but without the aggravation, "in respect it wes notour to thame, that the kingis majestie wes furth at the hunting, farder nor three quarteris of ane myle quhair the deid wes committit, the tyme of the committing thairof."—*Pitcairn's Criminal Trials.*

This is eloquence, as the utterance of passion and deep feeling ever must be, however rude the times and the language in which it is expressed. Of those times the letter affords a very curious and melancholy picture. It was not without reason that Alexander Napier urged the young courtier to use his personal influence with his majesty, and to lay before him all the aggravating circumstances, to induce him to insist upon the law taking its course. There was then one law for the poor and another for the rich; and the monarch, who had more than connived at the murder of his own mother, who had even accepted, from the haughty perpetrator of that crime, a pension as the price of a parent's blood, was not likely to institute an unbending measure of justice against murderers in a private quarrel, who were supported by the Lord Sanquar and the Laird of Buccleuch. When a rich man committed murder, he offered a sum of money by way of compensation to the nearest of kin to the deceased; and if this assythment, as it was termed, met with merited scorn, it generally proved successful in the shape of a bribe to the king and his council. Selling the king's pardon was then no inconsiderable source of his revenue, which accounts for the earnest and deprecating tone of the above letter.

From the records of the High Court of Justiciary, it appears that upon the 22d of January 1601, a criminal process was called against "Walter Scot, James Scot, and William Scot in Schostains, all brether to Robert Scot of Bowhill, and John Scot in Quholplaw, alias callit Johne of Bonytoune." That there "comperit Mr Allane Hammiltoune, servitour to Sir Archebald Naper of Edynbillie, Knycht, and as procurator for the said Sir Archebald, and produceit our Soverane Lordis letteres, deulie execute and indorsat, *purchest* be Alesoune Edmeistoune the relict, and the said Sir Archebald Naper as fader, with the brether and remanent kyn and freindis of umquhile Archebald Naper, gudeman of the Wowmet, to tak souertie of Walter Scot, &c. that they suld haif comperit befoir the Justice or his deputis, this day and place, in the hour of cause, and underlyne the law for the slauchter of the said umquhil Archebald; be the quhikis lettres the saidis personis ar denunceit our Soverane Lordis rebellis, and put to the horne. The said Mr Allane Hammiltoune protestit for releve of Johne Naper, younger of Merchinstoune, cautioner for production of the saides lettres: quhairupoune he askit actis and instrumentis." No further notice of the case is to be met with in what remains of these criminal records; and it is most probable that no other redress

was obtained. It is a revenge of its kind, that the house, of which these murderers were cadets, is now merged and lost in Napier,—the peer of that name being also Scott of Thirlstane.*

No sooner had the family of Merchiston suffered this misfortune, than it received another shock in the dreadful fate of Francis Mowbray. Mowbray was in England in 1602, when one Daniel, an Italian, who had conceived a spite against him, accused him before Queen Elizabeth of having urged his accuser to concur in a plot to assassinate the King of Scots. Elizabeth sent them both prisoners to Scotland. There was no evidence of the slightest credit against Mowbray, and the anxiety to procure even discreditable witnesses, showed that the fears and bad passions of King James were roused. Mowbray made this remarkable speech to his sovereign. "If ever I thought evil, or intended evil against my prince, God, that marketh the secrets of all hearts, make me to fall at my enemies feet! make me a spectacle to all Edinburgh, and cast my soul in Hell for ever!" James immediately required these words to be recorded and subscribed by Francis Mowbray, who did so, and also demanded, as he had done in England, the combat with Daniel,—a bold measure, as the latter was an Italian fencing-master. This was granted, and the 5th of January named as the day of mortal trial, which was to take place in lists prepared for the occasion in the great close of Holyrudhouse. The combat, however, was postponed by the king, under pretext of "confronting Francis with other two Scotish men sent out of England, *bot of light accompt*, because they had spent their moyen, and wes forced to leave the country."† In the meantime Mowbray was confined in the castle of Edinburgh, and the Italian in another chamber immediately

* See Note (F.)

John Bothwell, the philosopher's cousin, found himself under similar obligations to prosecute for the murder of his father-in-law, which occurred in the very same year. Sir John Carmichael, whose daughter Bothwell had married, was then warden of the west marches. The Armstrongs, Kinmont Willie's clan, being closely watched by the warden, they sent a brother of this noted worthy to fathom the intentions of Sir John with regard to them. Some foolish young men put yolks of eggs in the sword scabbard of this moss-trooper, who vowed a deadly revenge. Upon the 16th of June 1600, the Armstrongs waylaid the warden as he was riding unsuspectingly to hold a court, and "sett apoun him at the Raeknowis, quhair, with schottis of hagbuttis and pistolletis, thay schot him through the body." There was no difficulty with king or council in this case, and one of the murderers was hung in chains upon a gibbet close to the castle of Merchiston, as if to show its inmates that justice could sometimes be found. In 1606 the commendator of Holyrudhouse prosecuted another of the Armstrongs for the same crime, who was also executed.

† Calderwood.

above him. On the day after he had been confronted with the worthless witnesses, who only tended to strengthen his case, and, thirsting as he had been for the combat which was to test his honour, this unhappy youth was found dead and mangled at the foot of the castle rock. It was said, that endeavouring to effect his escape by means of his sheets and blankets, they proved too short, and he was killed in the fall. There was, however, another version. "His friends," says Archbishop Spotswood, "(for he was well born, and a proper young gentleman) gave out that he had been strangled, and his corps thrown down at the window. But this carried no appearance, and was believed of few."

But it did carry great appearance. In the first place, from the manner in which the Italian had been placed, above the cell of him he accused, it might be said that Mowbray *had fallen at his enemy's feet;* and these words stood recorded against him and signed by himself. In the next place, it was upon Sunday the 30th of January that he was killed, and upon Monday following, James and his councillors subscribe a letter to the Justice-Clerk, (in which great stress is laid upon the evidence of guilt derived from the attempt to escape,) desiring him to condemn the dead man to be hanged and quartered; and his quarters exposed upon the most public places of Edinburgh. Accordingly *that very day,* the ghastly and mangled body was placed at the bar of the High Court of Justiciary, having been dragged backwards through the streets. There it was pronounced against the corps for doom, "to be hangit be the craig upoun ane gibbet besyde the mercat croce of Edinburgh, and his body quarterit, and his heid ane leg and ane airm, to be put up above the Nether-boll, ane elne above the rest, and ane uther leg to be hung on the west-poirt of Edinburgh, and ane uther arme to be hungin upoun the Potter-raw-poirt: And all his lands, &c. to be foirfalt and inbrocht to our soverane lordis use." * So it was made to appear, that the unhappy youth had forespoken his own remarkable fate in every particular; and that he fell at his enemy's feet, and was made a spectacle to all Edinburgh, not in consequence of the contrivance of the king, but by the wrath and direct interposition of Heaven. John Napier too well characterized the times when he told his sovereign, that, "for partiality, prolixity, dearth and deceitfulness of laws, the poor perish, the proud triumph, and justice is nowhere to be found." Mowbray was no doubt a fiery youth, attached to the Catholic cause, and an active plotter. But there was no sufficient evidence that he in-

* Records of the High Court of Justiciary.

tendèd to assassinate the king; and this manner of wresting his solemn denial, to suit the purpose of a craven monarch which was to terrify secret enemies by sacrificing even the innocent, could only deceive a superstitious age. Thus, under a process most revolting in all its features to justice and humanity, perished a son of one of the finest old baronial houses in Scotland, the brother of two ladies whose youthful years were devoted to James' mother in her captivity,—of Barbara Mowbray, whose mortal remains even now moulder in a foreign land beneath the picture of her beloved mistress. *

Besides these distractions, the philosopher became involved in disputes and lawsuits with the junior members of his family, at the time of Sir Archibald's death, which remind us of the domestic discomfort of Kelper. Such events, belonging to the meaner currents of mortal passions, are not in themselves worthy of a record; but in this instance they are indicated by some original letters, which, though entirely domestic, will interest many who love to contemplate human nature in all its aspects, and who are curious in the characteristics of private life in the olden times. They serve, moreover, to refute the assertion, "that Napier dissipated his fortune by his experiments." †

He was, on the contrary, exceedingly anxious to keep his paternal acres well together, and, at the same time, to provide handsomely, as he did, for his numerous family. By the deed quoted below, ‡ it appears that, in the year 1586, he thought it necessary to take the precaution of preserving evi-

* See Mr Pitcairn's Collection of Criminal Trials for all the particulars of Francis Mowbray's fate.

† M'Crie's Life of Melville, Vol. ii. p. 322. Quoting *Dempster*.

‡ We, under subscryvand, testefeis be thir presents, that the Rycht Honorable Sir Archibald Neper of Edinbellie, Knycht, and Johnne Neper, fear of Merchamstoun, his sone and apperand air, comperand personallie before us, day and place underwritten, the said Johnne, frelie and benevolentlie, subscryvet and discharget his said fader of divers and sindrie actions of geir and soumes of money quherinto the said Sir Archibald was addebtit to the said Johnne; for the quhilk the said Sir Archibald hes sworne and promesit faythfullie and solempnitlie in our presentis, that, althocht he will not ihfeft his said sone and apperand air in all and haill his lands of Merchanstoune, speciallie the lands of Ovir-Merchanstoune, halden of the chaplayne of Sanct Kathereneis altar sumtyme situat within St Geleis Kirk of Edinburgh, conforme to ane contract of mariage of the dait ; not-the-les he sal never wodset, analie, nor dispone fra the said Johnne nor his airs, the said lands of Ovir-Merchamston, nor na pairt therof, bot sal keip the samen free, to be broukit of the said Johnne and his airs efter the said Sir Archibald's deceas. In witness of the quhilk

dence of a solemn and onerous declaration of his father to him, that the lands of Over-Merchiston, holding of the church of St Giles, and in which the philosopher had not been infeft, should never be alienated from him under any form. In the lands of Nether-Merchiston, holding of the crown, he was infeft upon a charter under the Great Seal. Sir Archibald, many years before his death, acquired the lands of Lauriston, near the sea to the north of his place of Merchiston, whereon he built a castle very much of the same description, and which still stands. * Here he occasionally resided, always busy with the barrels of the "Cunzie-house," or "ane copper sem neir the sie, fyve myle lang," and at the same time enjoyed the near neighbourhood of his father-in-law, the Baron of Barnbougall. Upon Sir Archibald's death in 1608, he left to his son Alexander the lairdship of Lauriston, a very handsome inheritance, especially for one born to neither lands nor rents. But Alexander laid claim to an additional inheritance, being a considerable portion of the lands of Over-Merchiston, in which, a few month's after his birth, he had been infeft by his

solempne aythe and faythfull promeis, we have subscryvit this present with our hands at Edinburgh, the tent day of Februar, the yeir of God 1586.

CHARLES NEPAIR, witnes. ARCHIBALD BRUS of Powfoullis, witnes.
HUMPHRAY HAMILTON, witnes. JOHN HAMILTON of Bardowie, witnes.
WILLIAM NEPER, witnes.

The following memoranda on the back of this document are interesting, being in the handwriting of John Napier, and indicative of his business habits and anxiety about his patrimonial interests.

"The deat of my father's infeftment of resignation, quhere he resigns the place and lands of Merchiston in the kingis hands for infeftment to be giffin me, is the year of God 1572, the first of October. The deat of the infeftment mead to my brother Alexander of the lands of Tipperlin, and nyn-aikeris landis at Lang-hill and Myr-Flatt, is in Anno Domini 1572, the 26 day of Januarie. Item, the deat of the chertour under the king's Great Seal is the aucht day of October, the year of God 1572. Item, the deat of the kingis precept under the quarter seal is of that saming deat. Item, the deat of my seasing of the place and heall landis of Merchistoun is in anno 1572, the auchtienth dey of Merch."—It must be remembered that at this period in Scotland, and down to the year 1600, the 25th of March was new year's day.

* Charters were granted to Sir Archibald Napier of Edinbellie, Elizabeth Mowbray, his wife, and Alexander Napier, son and heir of that marriage, of the lands and meadow called the King's Meadow, 8th February 1587–8, and of half the lands of Lauranstoun, &c. 16th November 1593, all in the parish of Cramond. Sir Archibald built thereon the castle of Lauriston, the initials S. A. N. and D. E. M. (Dame Elizabeth Mowbray) being among the decorations of two of the windows. The old tower was added to, and all the carved stones preserved in a manner that does equal credit to the taste and feeling of its proprietor, Thomas Allan, Esq.

father. It seems to have been in order to prevent this dilapidation of the family estates, that our philosopher purchased the promise of his father so solemnly witnessed.

At the time of his grandfather's decease, young Archibald Napier was with the king in London, and seems to have anticipated that his venerated father would be sadly disturbed by the undutiful conduct of some of the unruly members of Sir Archibald's family. He had written to Alexander an admonitory letter on the subject, and also to his own father to know how that admonition took effect. The philosopher replied as follows:

"To his belovit Sone, Archibald Neper, servitor to his Magestie.

"SONE,—Efter my very heartly commendatiouns, the occasioun of my deley of wreatting to you sa lang, was first, the lang absence of the wreattings ye sent to me with Robert Neper,* quhilks cam bot of leat into my hand; therefter ther fell outt betwixt me and my breithirs and sisters a controversie for the teinthis of Merchistoun, quhilks, altho they justly belangit to me, yit they boastit to lead them awey with the rest of the stoke unteinthit be me, and to that effect mead all the moyant they could to gather ther freinds, bot all for not. This causit me to continow unwreatting to you quhill I saw quhat end our teinth laiding sould tak. Now the counsell yesterday tuik ordour that William Neper of Wrichthousis sould gather and lead awey the said teinthis to his barnyairds of Wrichthousis, ther to stand till the saming be disydit till quhom it apperteinis: quhilk ordour is guid aneuch for me, and lytill to ther contentment. Ye desyrit in your letter to witt how your counsell, that ye wreatt to them, wrocht, concerning ther dewtefull behaviour towards me! bot, sone, ye sall witt that they war never as malicious as they heaf bein sin syn; reaging in all pryd, blasphemous words, and contemptuous deids; for the quhilk ther ar ane number of actiouns intendit, and to be persewit betwix them and me this winter, anent the lands of Tipperlin, Langhill, Myrflatt, and Myrsyd, neirhand the thrid of Merchistoun, quherof they think to defraud us, as also of dyvers evidents and taks of my teinths, rentell buiks, and others that they heaf takene awey out of my chertour-chist; and bostis therby to make us to tyne the lands of Merchistoun, as also to heaf purchasit of my father, on his deidbed, dyvers securities and subscriptiouns

* The Adept.

very hurtfull to us, quherupon they heaf intendit actiounis, cherging me to enter air that I may fulfill all thes bands maid be my father. This, and dyvers other things, disdainfullie they refuis to submitt to friends. For ordour taking with the quhilks turns, against them, and also for taking of consultation quhat sall be doin toward your awin esteat, that ye may be satlit here amangst us, I and your other freinds ar very desyrous ye heast you hither to us, that we may treat, resolve, and conclud upon all things to be doin for the weill of our houss; efter the quhilk conclusioun, ye mey, giff neid beis, return bake again to Ingland, and put ordour to your office and all your affairs, that therefter ye may heast you hither for constant residens. Sa, luiking for your cumming with all diligens, I remitt the rest of maitters till our meitting, quhilk war tedious to wreatt at this tym. And sa committis you and all our guid freinds in thes pertis to the protectioun of the eternall. Ye sall make my commendatiouns to Doctor Craig,* and other freinds ther; my wife and bairnes commends them to you; the lairds of Keir, Muschett, and other freinds here with me commends them all to you. At Merchistoun this secund dey of Septimber 1608.

" Be your loving father,

" JHONE NEPAIR of Merchistoun."

But Archibald Napier could not tear himself from the court of London even to obey this urgent invitation, as he informs us himself in a page of his memoirs where he mentions his father with reverence and affection. He says, that, having followed King James into England, " I served him there as gentleman of his privy-chamber, the space of sixteen or seventeen years, or thereabout, continually; till his majesty was pleased to cast the Earle of Somerset out of his favour, and take in his place, George Viliers, afterwards Duk of Buckinghame, a powerfull favorite, and no good friend of myne, because I, with some of our countrymen, endeavoured to support Somerset, which, in his construction, wes ane opposing of his rysing. Therefore I, *being before much desyred thereto by my worthy father,* took this occasion to repaire to Scotland, and expect the events of things; wherewith I did acquaint the king, and desyred his leave, which he granted; but not before he made his favorite (against his mynd, I think,) to give me large pro-

* The friend and correspondent of Tycho Brahe, and physician to James VI.

mises of friendship, and faire blossomes of protestations and complement, which never bore fruit."*

The expressions " my worthy father," used in reference to the very correspondence we are quoting, will be a sufficient antidote against all the virulence of the following epistle from Alexander Napier to his nephew, which is nevertheless too characteristic to be omitted. We cannot spare a picturesque sketch of our philosopher beside the deathbed of his father, however severely executed; and prolix as the writer himself confessed it to be, we have not the heart to garble a letter so minutely descriptive of a domestic scene occurring nearly two centuries and a-half ago. Alexander, as usual, calls his nephew brother.

" To his well-belovit Brother, Archibald Nepier, Yonger of Merchistune.

" LUVING BRITHER,—I perseve your kyndnes be your accusatione, in so far as ye blem me for not acquenting you quha was willing to underly paines for my sak. Suirlie I had so done gif he had not bein thair resident quhais cheiflie was the erand, to quhom I referred the arnist laboring with you, or be quhat moyenais, to himself. I give you thankes for the delyverie of my father's letter, quhom, as ye wryt, ye hev now hard to be depairtit this lyf; and because thair is sumthing, quhilk I red in your letter, quhilk requires speciall answer, pardone me gif I be ainie way prolixet; for in gainstanding that argument, (quhilk seimes to me to hev sprung from your faither's informatione, thocht I afferm it not, sen ye hev said the contrair,) thair must be sperit sum tyme. The word I mark is that my possessione can not be retinet with seif credit or consience. Your father, befoir aver my father tuik bed, was requisted be him to conferme all rechtes quhilk he had passet in my favores, quhilk indeid he refusit, and not onlie schew to me, bot to sindrie others a resone (as wald appeired) of his refusall, quhilk was a testificatione of certane freindes quhair my father had solemlie by aith promiset niver to hurt the house of Merchistoune; now, seyes he, give I consent to the laird's desyre, not onlie he bot I sall boith consent to hurt the house. Quhairfoir I heving sein this solem aith subscryvet be frendes, schew to my father that sik a thing was offerit to my sicht: and is it, quoth my father, subscrivet be me? na said I: quhat devall ailse the man, quoth he, to purches that of ainie freindes, quhat culd I not hev subscryvet? quhair was it daitit? I schew him: give ever,

* MS. Memoirs.—*Merchiston papers.*

quod he, I maid sik a promise, as indeed I did not, it is posterior to your richtes be monie yeires; and yet, quod he, I never myndet to hurt the houss, for I hev sald nor wadset nothing, and quhat I hev done to you, I hev put better in place of it; for the redemptiones, quhilk I uset of wadsetes be your gudsier disponet, ar much better than your lyverentes. Ye, as that the laws of the cuntrie will repair evrie man to his just claimes, so I pre God it be, than sall I reseive no wrong, and give I offer onie, I sall find a stryp for my folie. Bot to setisfie you, quhom I tak not to be informit in that matter, knaw (as I speik it so afoir God it is veritie, nather sall I ever be brocht bak of this as a lier) thair was a contract of mariedg betwix the laird of Keir, taking the burdine on him for your mother, and the laird my father, and your father with the Bishop of Orkney, befoir my birth, quhairbe the laird my father oblises him to give infeftment to his sone of the landes of Merchistoune halden of the king, and pultrielandes, incorporat in en barronie be King James the Thrid. Now, seyes your father, justlie I klaime the landes, brother, in your possessione. Quhairunto I answer, that all the landes of Merchistoune ar not halden of the king as his superior, for they are devydet in Nether and Over Merchistoune, the ane halden of the king, and the other, to wit the over landes, halden of the kirk of Edinbruch, or, to say the treuth to you, halden of the toune of Edinbruch in feu ferme for the payment of twentie markes be yeir, lyk as may be provin by mainie evidentes, retoures, and last be my father's awen sesing, quha was faine to enter be thaime, lyk as I trow yours sall be, or to lose much better than ainie thing I hev of the house. This is my richt, and this is the stait of metters; and it was my father's will and plesur, quha had power to give it me, that by this forementioned richt I suld bruik it; quhilk is mainfest be my charter and sesing given quhan I was not past half a yeir auld, and confermit be him most constantlie be word, as on Setterday twix fyve and six at eiven, quhilk was the nicht befoir he died, at quhilk tyme Mester Richert Dicsone desyret him to blise his bairnes, quhilk he did, and than your faither, perseiving the tyme of daith to be neir, drew Mr Richert by, and desyrit him to ask gif his father had anie greif in concience that trublit him, and tauld him the resone of that questione, bot willet him not to be so particular with his father as to expres it. This Mester Richert schew to me, that he was to speik as derectit be your father, first to see gif I thocht gud thairof; yis, said I, and so he went to tell your father, and cumming bak to me, quha was than standing at the laird's bed syd, he fell in

other purpose with the laird, quhairat I wonderit, and asket quhat he meint; seyes he, 'I am dischairget exep I speik it in particular;' in quhat particular, quod I? 'in the particular betwix you and him;' than speik it said I. So Mr Richert seyes to my father, 'Sir, ar ye in anie trubell of conscence?' 'Na,' quoth he, 'I thank Chryst I am assuret of salvatione.' 'Find ye no greif of mynd for anie wrong ye hev done to your eldest sone in favors of Alexander?' 'Wrong! I hev done no wrong, Alexander's is the richt;' and speiking to your father, and lykweise poynting, he said, 'Jhone ye hev no richt, I maid you no richt.' Now, quhat sall I do? steill from thir richtes? forsaik his gift quha was nather burdinet in consiens for anie wrong, nor aschemet to sey this befoir your father, brother Jhone,* and Alex^r^ Mentieth; and quha gef me the same onaskete, and befoir I culd ask it, and quha confermit all in the last end? This is the questione quhilk is lyk to aryse, and how we ar uset for the respect of this, judge ye. For me, I nether thocht it freindlie, much les brotherlie, and no weyes honest; yea not to hev bein done twix enimies. To tell you from the beginning; our father in his lyfetyme, bot on his bed, sent Sir James Sandilans to speik with your father, and desyre him to tak a sume of monie for his airship; quhilk he refuset, aledging he knew not the waill of it; *re infecta* he returnet, and shortlie after my father deciset on the Sunday; quhilk dey Sir James was sent for be your father, and on the same day my sisters had vowet niver to tak kyndlie rest, nor go to nekit bed quhill thair father was buriet and put to his rest; and lykweyes war onder promise niver to ly in that house behind him. Quhairfor Elspet,† in the name of the rest, sent Sir James to your father to schaw him thair resolutione, and desyre him to tak the house, and ather subscrive ane inventur of the geir, and be thairfoir answerabell, or else to buy the same for the soume of sax hundreth marks; quhilkas he refuset, or to common of befoir the buriell of his father; the Wednesdey efter was the dey quhairone he was buiret; and your father spok to me concerning the pleniseine and the house, and it was appoyntet in the audience of Williame Wardlaw of Babertune, that my sisters suld cum to Edinbruch on Monedey nixt following, and tak, with him, computent ordur for quieting all. On the Sondey he preventit all frendlie duing, be sending ane officer of airmes with a chairg within four and twentie hours to give over the

* The philosopher's eldest son of the second marriage.

† Elizabeth Napier, Sir Archibald's eldest daughter. She afterwards married, 1*st*, Lord Ogilvy of Airly, by whom she had a son James; 2*d*, Alexander Auchmutie, gentleman of the bed-chamber.

place, and, quhilk was foullest, in his coppies he pat ane ' &c.' for to hyd the chairg from us, quhilk was onder paine of horning; and quhan I send to se the principall letters, he refuset. This is his duing! and yet we delyverit him the place on the Monedey, quhilk dey he brocht the schirref to gif him possessione, in quhas presence he promisit faytfullie to give us all the geir, quhan we suld require it, quhilk was left; and thocht the schirref requistet him to keip his promise, he refuset, quhill the exequtors are fane to hev chairget for thair geir. I am long and cannot truble you with all thinges. Bot exhort him to keip honestie and consience. I could tell you a particular quhairin he wald hev bein inkyndlie in, bot that I leave, and commettes you to God with hairtle commendatione.

" Your brother, to his power,

" ALEX^R NEPER of Lauristone."

Under these unpleasant circumstances, which must have been torture to the gentle and studious dispositions of our philosopher, was he installed into his father's place.

As for the fiery Alexander Napier, in consequence of his vivid ideas of retributive justice, he became—a Lord of Council and Session, by the name of Lord Lauriston. In those rude and ardent times, we can imagine a full exhibition of " the fifteen" to have resembled a menagerie at feeding hours, and well worth double price to have witnessed. A full attendance, however, was rarely to be counted on. A judge in his place one day was gone the next. It might be " auld Durie," the President, carried off in his walks as if by demons, and concealed no one could tell where; or Hallyards murdered on the shore of Leith; or Edzell sent to Dumbarton Castle for his share in a desperate feudal combat fought on the High Street during the previous night; or the whole court adjourned to make room for the criminal trial of their brother Cliftonhall's only daughter and heiress, who was " takin to the Castel-hill of Edinburgh, and there bund to ane staik, and burnt in assis, quick, to the death," for witchcraft. Among these, or such like, sat Alexander Napier, whose dictum, so encouraging to litigation, was " niver imbrace dishonorabell agriment, for all is dishonorabell quhair thair is not eie for eie, and tuith for tuith;" and who moreover read his session-papers in the stars, and wrote his interlocutors in the twelve houses of Heaven, being a most learned judicial astrologer.

An evidence of this part of his character is preserved in a very curious letter,

dated "from Lauriston, this Sonday," and addressed "To the Right Hon^ble, my very gud Lord, the Erle of Laudien." The letter itself is written in Latin, and stuffed full of astrological jargon; it affords, however, a curious trait of the times, and is given below as an example of Alexander Napier's classical and cabalistic style.* Lord Lothian, it appears, was a great friend of the laird of Lauriston, and had obtained from him the horoscope of his infant son. In his paternal anxiety, this nobleman caused some other person learned in the stars to erect a scheme of his son's nativity, which he transmitted to his friend, requesting his judgment. Lauriston, however, declines the task for very substantial reasons. He tells his Lordship that all astrologers do not follow the same mode of erecting a figure of Heaven; that some divide the zodiac into twelve equal parts, and others

* "Non omnibus eadem usitata est erigendi forma; quidam enim ab horoscopo, Domine mi, exoriuntur, et totum zodiacum ex ordine in 12 equales dissecant partes; alii non zodiacum, sed ipsum æquinoctialem in 12 partes distrahunt. Campanus circumlum Orientis et Occidentis per verticis punctum transeuntem in 12 partes distinguit. Qui Joannis Regiomontani sequuntur rationem, æquinoxtialem dividunt in 12 æquas partes sed domicilia inæqualia efficiunt, præterquam sub æquinoctiali habitantibus, ita et eclipticam. Qui thema natalitium filii tui erexit, ab Arabum forma differre se fatetur, et ab Alcabitii, quæ secunda est ratio memoratarum, etiam dissidet, propterea quod æqualiter dividat zodiacum; atque sic, eadem ratione ductus, mihi a Campano diferre videtur, nec sequitur Regiomontanum qui semper domicilia inæqualia efficit, cum hic æqualia. Cum igitur non sequi quemquam horum, mihi videtur perperam facturum me si judicium aliquod facerem aut certi aliquid de filiolo statuerim. Dic tamen me falli, et finge eum Alcabitii vestigiis incedere, tamen cum Alcabitius et Regiomontanus non eadem ratione utantur in erectione thematum, necesse erit ut hoc postremum judicium non congruat cum priori illo quondam a me facto; proinde, ne mihi contrarius esse videar, pace tua, malim mullam quam ullam ferre sententiam. Intactum igitur ad te remitto, non immemor officii mei, nec benevolentiæ tuæ quæ me ad longe difficiliora suscipienda pro te hortantur. Sed [ut sciatis] veram hanc esse causam a me allatam, exemplo in re tibi satis nota ostendam. Continetur prima matrum cum prima filiarum a geomante aliquo, sic et secunda mater conjungatur secundæ filiarum, sic tertia tertiæ, quarta quartæ, nonne producentur aliæ nepotes, alii testes, alius quoque Judex, quam si quis primam et secundam matrem tertiam et quartam matrem, primam et secundam filiam tertiam et quartam filiam conjunxerit? atque etiam nonne aliud judicium in eo cum nepotes testes atque ipse Judex qui primas obtinet sint dissimiles, judicium dissimile erit? Pari ratione si quis, Regiomontanum secutus, dixerit 21 ♒ esse in cuspide primæ domus, cum aliter alius 18 ♐ venerem quoque asserat, sic qui pisces horoscopi initium dicit octavæ domus dominam, atque ego martem octavæ imperare, nonne videtur tibi, ex tanta diversitate diversum judicium oriri debere? His rationibus impulsus judicium novum non exhibui, possum tamen cum meo et artis ludibrio quæ semper honoranda est. Vale. Tibi adictissimus.

"ALEXANDER NAPEIR."

the equator; that Campanus adopts one method, Regiomontanus and Alcabitius another. "Whoever," says he, "has rectified this nativity of your son, confessedly differs in his method both from Campanus and Regiomontanus,—the Arabian and Alcabitian methods. Now, as he appears to have a way of his own, it would be exceedingly rash in me to pronounce or predict any thing thereupon regarding the fate of your little son. But suppose I am deceived, and that he really follows Alcabitius, still, as Alcabitius differs from Regiomontanus, were I to give judgement here it might be inconsistent with what I have already given, and thus lead me to contradict myself. I therefore return the nativity untouched, however mindful of my duty and your kindnesses, which would impel me to undertake much greater difficulties for your sake." He then adds what he calls a sufficiently familiar example, to convince his Lordship of the contradiction that might arise from the contrariety of methods, and, as an excuse for not pronouncing a second judgment, which might haply afford the profane a scoff both against himself and the "*ever-to-be-venerated art.*" The letter in the Merchiston charter-chest is probably an old copy taken at the time. The address might mean either *Lothian* or *Loudoun*. But Lord Lauriston died in the year 1629, and Sir John Campbell of Lawers, first Earl of Loudoun, did not obtain the patent of his earldom until some years after that date. The letter must have been addressed, therefore, to an Earl of Lothian, and probably it was to John Napier's class-fellow, Mark Ker, commendator of Newbottle, who became first Earl of Lothian by patent in 1606.

The family dispute (which gave rise to the only harsh expressions ever breathed against our philosopher, and those unjustly,) terminated before the 9th of June 1613, on which day he was served and retoured heir of his father in the lands of Over-Merchiston. That he had dissipated his means by his inventions is an assertion characteristic of the inaccuracy of Dempster.* During his father's lifetime, he was infeft in the extensive barony of Nether Merchiston in the Lothians, including the pultrelandis and their hereditary office. Also in the lands and miln of Gartness, the lands of Dolnare, Blareoure, Gartharne, the two Bollatis, Douchlass, Badwow, Edinballe, Ballacharne, and Thomdaroch, with the forests and woods thereof, and the fishings in the waters of Anerick and Altquhore, situated in the earldom of Levenax and shire

* The work to which Dr M'Crie refers is, *Historia Ecclesiastica Gentis Scotorum*, by Thomas Dempster; a man of great learning, but not to be trusted as an authority for facts.

of Stirling; also the fourth part of the fishing of Loch Lomond; also the half of the land of Ardewnane, with the right of patronage of the church thereof, with the fishing of Loch Tay, within the lordship of Discher and Toyer in Perthshire. In the Menteith, he was infeft in half the lands of Rusky, half the lands of Thom, the three Lanarkynnis, Cowlach, Sauchinthom, the miln of Lanark, the lochs and fishings of all the said lands, the third of the lands of Cailzemuck, and the fishings on the Water of Teith, and loch of Gudy. All the above estates in the Levenax and the Menteith, composed the barony of Edinbelly. But he was likewise infeft in the lands of Blairnavadis, and the island of Inchmone of Loch Lomond; also in the lands and miln of Achinleschy; also in the lands of Boquhople, which last were disponed to him the year before his death, by Archibald Edmonstone of Balintone, whose daughter, probably, it was to whom his murdered brother had been married. Besides all this, his father acquired the estate of Lauriston, and had high emoluments from his office. To have dissipated such means, John Napier must have "played the ryot" indeed. These estates all descended, improved and undiminished, to his posterity, except that he sold the pultrelands and office of king's poulterer to Nisbet of Dean, in the year 1610, for one thousand seven hundred marks.

With the exception of those little episodes we have noticed, of battle, murder, and sudden death, Popish plots, pestilence, and famine, ever and anon demanding more or less of our philosopher's time and attention; together with the whole charge of his own twelve children, and more than half the charge of his unruly brothers, besides farming operations, extending from the shores of the Forth to the banks of the Teith, and the islands on Lochlomond; mingled with occasional demands upon his "singular judgement," from the General Assembly of the church, to the dark outlaw who indulged in magic, and the courtly lawyer who sought a lesson in mensuration; with the exception, we say, of these inevitable interruptions, our philosopher lived the life of an intellectual hermit, entirely devoted to his theological and mathematical speculations, and delighting in no converse so much as the clear crow of his favourite bird, more powerful to "dismiss the demons" than all the incantations of Lilly.

Betwixt the years 1593 and 1611 his mind was divided betwixt his great theological work, which he considered to be yet only in embryo, and the con-

fident hopes he cherished of being able to emancipate science, now in manifest danger of being strangled by the increasing coils of calculation. Still, however, the progress of religion was his chief object. The Plain Discovery had found its way into every Christian country, and Napier had paused eighteen years for the judgment of the Protestant brethren, and the reply of a Catholic champion, as preparatory to publishing his Latin commentaries. He had the satisfaction in that time to find his work received with growing admiration by the well-affected and regarded at least with respect by the adversary. But the former expressed doubts upon some controversial points, and the latter threatened to give battle to it all; and the consequence was, that, at the end of that long period of probation, Napier still delayed his Latin folio. He published, however, in 1611, a new edition of the Plain Discovery, and added what he entitled, "a resolution of certain doubts proponed by the well-affected brethren, and needful to be explained in this treatise." The sentence with which he introduces this additional treatise is characteristic of his gentle dispositions, and shows how much he must have been harassed, and how little he could have been to blame in the contention with his brothers. "As," says he, "we are commanded by the Spirit of God to separate ourselves from all disputers contentiously by strife of words, (1. Tim. vi. 4, 5.) so are we bound and commanded, with gentleness and meekness to instruct all that are doubtful minded, that they may know the truth. (2. Tim. ii. 23, 24, 25, 26.) And seeing there are certain well-affected brethren, who, not in the spirit of arrogance and contention, but in all sobriety and meekness, have craved of me the resolution of some doubts arising upon my treatise of the Revelation; therefore, discharging my duty, I have thought good to write a resolution of their doubts, and to insert the same in this treatise upon the Revelation, for the better satisfaction of their reasonable desire, and instruction of others meek and zealous persons whom the like doubts might hinder. As to the contentious and arrogant reasoners, I leave them to the mercy of the Lord."

The grasp of his mind, the unaffected simplicity of his nature, the extent and variety of his knowledge, are all again manifested in this addition to his theological labours. It is written in the same clear and condensed style as the principal commentary, and in like manner is composed under the form of distinct propositions, each supported by a chapter of proofs and arguments, in which the most familiar examples are mingled with deep research. The enumeration of these propositions will point out the nature of the doubts

which, in the course of eighteen years, had suggested themselves to Protestant divines. "1. That the space betwixt one year of jubilee and the next year of jubilee is 49 years precisely, and not 50 years as some do suppose. 2. That the year of God 71, and consequently each 49 years thereafter, are jubilee years, and not the years of Christ's birth, as some suppose, nor of Christ's passion, as others. 3. How and for what causes both the last seal, and first vial or trumpet do begin at the destruction of Jerusalem in anno 71, and not the last seal to end before the trumpets and vials do begin. 4. That the fourth kingdom in Daniel is the monarchy of the Romans, and not the small divided kingdoms of the Seleucians and Syrians, as some of late do suppose. 5. That the little horn in Daniel, chap. vii. doth signify the Roman Antichrist, and not Antiochus properly, as some suppose. 6. That the Pope's kingdom, both spiritual and temporal, began in the days of Sylvester I. betwixt the years of God 300 and 330. 7. That the Pope, during his foresaid reigns, hath possessed and corrupted the outward and visible face of the church, and hath persecuted God his true church, and made the same to lurk and become latent and invisible all these days."

At the time when Napier published his larger work, we find him engaged in the contract with Restalrig; and in 1611, when he again appeared before the public as a theologian, he was a party to another contract, characteristic of his times, and connected with matters very foreign to his natural bent and occupations. It is well known, that, about the year 1603, the Lennox, in which the philosopher held so extensive an interest, was wasted by the memorable conflict betwixt the chief of Macgregor and Colquhoun of Luss, known by the name of the Field of the Lennox, or the Raid of Glenfroon. Macgregor, having been most treacherously entrapped by the Earl of Argyle, was tried for his life with several of his clan, all of whom, found guilty of slaughter, stouthreif, treason and fire-raising, were gibetted together. John Napier was one of the jury, along with Stewart of Garnetullie, Campbell of Glennorchie, Robertson of Strowane, Crichton of Cluny, Blair of Blair, Graham of Knokdoliane, Robertson of Fastkeilsie, &c. upon whose verdict this unfortunate chief was condemned to die. The clan Gregor, driven to desperation by the relentless pursuit of Argyle and the Campbells, became broken and lawless, and infested the Lennox like banditti. Considering the share he had in the condemnation of their chief, the philosopher could not expect forbearance

at the hands of these broken men, and the following contract indicates that he found the law of the land no sufficient protection from their inroads.

" At Edinburgh, the 24 day of December, the year of God 1611, it is appoyntit, aggreit, and finallie contractit, betwixt Johnne Napeir of Merchistoun on the ane pairt, and James Campbell of Laweris, Coline Campbell of Aberurquhill, and Johnne Campbell thair brother-germane, on the uther pairt, in manner, forme, and effect as eftir followis; to wit, forsamekill as baith the saids parteis respecting and considdering the mutuall amitie, frendship, and guidwill quhilk hes been thir divers yeiris bygane betwixt the Lairds of Merchistoun and Laweris and thair houssis, and willing that the lyk kyndness, amitie, and frendship, sall still continew betwixt thame in tyme coming; thairfoir, the saidis James Campbell of Laweris, Coline and Johnne Campbellis thair breither, faithfullie promittis, that in cais it sall happin the said Johnne Napeir of Merchistoun, or his tennentis of the landis within Menteith and Lennox, to be trublit or oppressit in the possessioun of thair said landis, or their guidis and geir, violentlie or be stouth of the name of M'Grigour, or ony utheris heilland broken men; in that cais, the said James, Coline, and Johnne Campbellis to use thair exact dilligence in causing searsch and try the committaris and doars of the said crymes: and, on the uther pairt, the said Johnne Napeir of Merchistoune promittis and oblissis him and his airis to fortifie and assist with the saidis James, Coline, and Johnne Campbellis in all thair leasum and honest effairis, as occasioun sall offer; and herit baith the said parteis faithfullie promittis, binds, and oblissis thame, *hinc inde*, to utheris. In witnes of the quhilk thing, (written be George Banerman, servitor to Antone Quhyte, wryter in Edinburgh,) baith the said pairties have subscryvit this presentis with thair hands, day, yeir, and place foirsaid, befoir thir witnesses; Johnne Napeir, sonne lauchful to the said Laird of Merchistoun; Alexander Menteith, his servitour; William Campbell, sone naturrell to the said Laird of Laweris; and the said George Bannerman.

JAMES CAMPBELL *of Laweris.**
JHONE NEPAIR *of Merchistoun.*
JHONE CAMPBELL *of Ardewnane.*
COLEINE CAMPBELL *of Aberurquhill.*

* Sir James Campbell of Lawers was the father of Sir John, who was created Earl of Loudoun, Lord Farrinyean and Mauchline in 1633, and was High Chancellor of Scotland in 1641.

This completes the catalogue of our philosopher's distracting connections with the troubles of his times, from the Douglas wars, to the battle of Glenlivet, and from that to the raid of Glen-Fruin. Could he have known the song (for he loved the muses) which that raid was yet to call forth from the genius of the greatest man, next to himself, whom Scotland has produced,—could he have heard the wild names of *his own* Levenax so enchantingly mingled,—he would have forgiven the Macgregor.

Proudly our pibroch has thrill'd in Glen-Fruin,
And Banochar's groans to our slogan replied;
Glen Luss and Ross-dhu they are smoking in ruin,
And the best of Loch Lomond lie dead on her side.*
Widow and Saxon maid
Long shall lament our raid,
Think of Clan-Alpine with fear and with woe;
Lennox and Leven-glen
Shake when they hear agen,
"Roderich Vich Alpine dhu, ho! ieroe!"

Though no man knew it, the destiny of Napier was now about to be fulfilled. High as he stood in the estimation of his country for talents of no ordinary kind, it was not in his own lifetime that his power could be appreciated. Scarcely conscious himself of the magnitude of the achievement, and while he was seeking his immortality in other speculations even more unapproachable, he had broken the spell which through all ages had bound the genius of numbers in her mysterious labyrinths,—which, invincible to the schools of Greece, and undisturbed by the revival of letters, had baffled Archimedes and tortured Kepler. In the year 1614, when his mind had exhausted the body, and, to use his own expressions to Charles I., "now almost spent with sicknesse!" Napier published his MIRIFICI CANONIS DESCRIPTIO LOGARITHMORUM.

* See the note to this line in the Lady of the Lake for an account of this raid, and the subsequent fate of the Macgregor and his clan.

CHAPTER IX.

THAT our own estimate may not seem hyperbolical to those who may imagine the Logarithms to be "but an useful abbreviation of a particular branch of the mathematics," * we shall commence this chapter with the words of a philosopher who knew what he was writing about. "It will be admitted," says Sir John Leslie, "that artificial helps may prove useful in laborious and protracted multiplications by sparing the exercise of memory, and preventing the attention from being overstrained. Of this description are the *Rods* or *Bones*, which we owe to the early studies of the great Napier, whose life, devoted to the improvement of the science of calculation, was crowned by the invention of logarithms, *the noblest conquest ever achieved by man.*" † He who wrote this sentence was no granter of propositions, or one very widely awake to excellence in others; nor had he any ties, beyond the sympathies of science, to him he so ardently eulogized. But he was deeply imbued with the powers of numbers, and knew, if any man did, the relative value of every conquest in the mathematics; he pronounced this eulogy in the full freshness and vigour of his own mathematical mind, and while deliberately and profoundly tracing through every age, and in all countries, the triumphs of logistic.

It may be said, however, that such praise must be exaggerated, because, assuming that the Scotch philosopher attained what the schools of Greece and the lights of Germany were unable to accomplish, yet England produced Newton! Unquestionably, the author of the modern analysis, the discoverer of the composition of light, the prophet of universal gravitation, is "immortal

* Pinkerton.

† Leslie's Philosophy of Arithmetic.

by so many titles," that no country and no age can point to his equal. But, (without taking into account many peculiar disadvantages under which Napier laboured,) if we consider what really constitutes the magnitude of any conquest which an individual can claim, we will be inclined to admit, that the expressions used by Sir John Leslie are not the loose and exaggerated utterance of admiration, but must have been founded upon a deliberate review, and just estimate of such claims; for if it be true that the test of the noblest conquest which humanity could achieve is, first, the indication it affords of abstract mental power, and, second, the utility and extent of its practical application to human necessities, as well as to physical research, not all the marvellous combinations in Newton's mind, of mathematical resources with applicate skill, will wrest from Napier the eulogy he has obtained.

In respect of its indications of abstract mental power,* his invention or discovery, (for it combines the characteristics of both,) must, it is true, undergo a comparison with the fluxionary calculus of Newton; and by an authority, at least as high as what we have quoted, that wonderful analysis was pronounced to be "the greatest discovery ever made in the mathematical sciences." But the same author, in the same work, had previously declared, after a minute inspection of the intellectual order of the Logarithms, "Of Napier, therefore, if of any man, it may safely be pronounced, that his name will never be eclipsed by any one more conspicuous, or his invention superseded by any thing more valuable."† Nor are these eulogies of Napier and Newton inconsistent with each other. The higher calculus was not so much an individual conquest, as the grand result of a succession of victories under separate leaders, and during distinct campaigns. Euclid, Cavalieri, and Descartes paved the way directly to that calculus. The torch that fired the pile had been passed from hand to hand through a succession of ages; and while a series of the

* La Place, a name second only to Newton in modern science, was struck with the abstract grandeur of Napier's invention, which he thus powerfully characterises:—"Il (Kepler) eut dans ses dernières années, l'avantage de voir naître, et de profiter de la découverte des Logarythmes, artifice admirable, dû à Neper, Baron Ecossais; et qui, en reduisant à quelques heures, le travail de plusieurs mois, double, si l'on peut ainsi dire, la vie des astronomes, et leur épargne les erreurs et les dégoûts inséparable des longs calculs; invention d'autant plus satisfaisante pour l'esprit humain, qu' il l'a tirée en entier de son propre fonds. Dans les arts, l'homme emploie les matériaux et les forces de la nature pour accroître sa puissance; mas ici, tout est son ouvrage."—*Système du Monde*, Tome ii. p. 266.

† Professor Playfair's Dissertation.

most illustrious names in the annals of speculative power mark a constant progress to the point where Newton and Leibnitz *simultaneously* conquered, that gradual approach was latterly covered and fortified by a cloud of skirmishers, whose collateral aid, illustrated by such names as Torricelli, Roberval, Fermat, Huygens and Barrow, well deserves to be remembered. The invention of Logarithms presents a different aspect. They were the result of an unaided, isolated speculation, and unlooked for when they appeared; a victory, in short, in defiance of all established rules of progressive knowledge and systematic conquest. * The algebraic analysis *ought* to have preceded the invention of logarithms. "Though logarithms (says Playfair) had not been invented by Napier, they would have been discovered in the progress of the algebraic analysis, when the arithmetic of powers and exponents, both integral and fractional, came to be fully understood. The idea of considering all numbers as powers of one given number would then have readily occurred, and the doctrine of series would have greatly facilitated the calculations which it was necessary to undertake. Napier had none of these advantages, and they were all supplied by the resources of his own mind." What right had a philosopher of the *sixteenth* century, born and bred, too, among the savages of Scotland,—"*Scotus Baro, cujus nomen mihi extitit*,"† as Kepler at first designed him,—to anticipate triumphs which, in the order of things, belonged to the close of the *seventeenth!* What had he to do with so powerful a command of the doctrine of series, and the theory of indices, before that department of mathematical science was evolved,—or with the fruit of a tree before it was planted! He had, it seems, resources within himself, by means of which, outstripping the slow progress of science, he attained a point, the natural intermediate steps to which were yet to compose the conquests of future philosophers. So, when the

* Sir David Brewster, speaking of the astronomical discoveries of Newton, says, "Pre-eminent as his triumphs have been, it would be unjust to affirm that they were achieved by his single arm. The torch of many a preceding age had thrown its light into the strongholds of the material universe, and the grasp of many a powerful hand had pulled down the most impregnable of its defences. An alliance, indeed, of many kindred spirits had been long struggling in this great cause, and Newton was but the leader of their mighty phalanx,—the director of their combined genius,—the general who won the victory, and therefore wears the laurels."—*Life of Newton.* This last was for the benefit of military men; and we may add, that, in the great fight of the seventeenth century, Bacon was quarter-master-general, and surveyed the country; but Napier, so rapid in his evolution of numbers, commanded the cavalry, was *first* in action, and the enemy never recovered his first charge. Thus Britain won the day.

† A Scotch Baron whose name has escaped me.—*Kepleri Epistolæ.*

illustrious adventurers, who long after his time followed the exciting and ever-growing path of analytical discovery, by which the shrine of the higher calculus was at length unveiled, detected in their progress the shrine of the logarithms too, there was nothing to seize, for that spell had been broken already.

On the other hand, so far as regards practical utility, what may compete with the invention? A modern astronomer could better spare his telescope than his tables of calculation; and almost miraculous as is the power of the infinitesmal analysis, the finest steps in the working of that exhaustless instrument of human investigation are dependent upon the aid of logarithms. When Newton attained the analysis, he had been already gifted with that engine, which ultimately afforded his calculus "many of the most refined and most valuable of its resources."* He had, it is true, only to contemplate the logarithms through the medium of his own analysis in order to obtain a far simpler view and easier command of the former invention than its author could possess; but it must ever be remembered, that, although Newton had the logarithms when he discovered the calculus, Napier had not the calculus, nor the steps which led to the calculus, when he conceived, discovered, and computed the logarithms. While, even in the comparison of practical utility, Napier's invention claims a sublime fellowship with Newton's, the latter does not descend in like manner to mere mortal necessities. Logarithms are so useful and prevalent in the ordinary arts of life, that many a practical man is most efficient with those tables, who neither knows nor cares about the mystery of their construction, and would sooner think of mastering the craft of his own spectacles, than the fine theory of that invention. The practical application is familiar to the antiphilosophical midshipman at sea; yet, so uncertain was the art of navigation until this aid raised it to the sciences, that the scriptural prophecy, "*Multi pertransibunt et augebitur scientia*," † may be said only to have been fulfilled when the logarithms were published. High, then, and indisputable as is the throne of Newton, Professor Leslie was right, and used no exaggerated expressions, when he called Napier's invention *the noblest conquest ever achieved by man*; and, the more closely the mathematical achievements of all ages are examined, the more just will this eulogy appear.

Of the two great branches of mathematical science, arithmetic and geome-

* Playfair.

† "Many shall go to and fro, and knowledge shall be increased."

try, the first devoted to the properties of numbers, and the latter to those of extension or space, unquestionably the most recondite, the most fertile, and the most generally useful is the science of numbers. To the highest order of the *theory*, or purely abstract consideration of numbers, and to the most beneficial results of their *practice*, the system of logarithms equally belongs. When the restorers of letters gradually recovered the fragments of antiquity, and gladdened the world with riches redeemed from the lava of barbarity, there were no mathematical resources disclosed which could equal in power and beauty that which Scotland can claim as her own. The fame of the Grecian schools is chiefly founded upon their combinations of the properties of space, possessing a purity of abstract speculation, and a severity of reasoning, which, if that mystical estimate of mathematical excellence could be admitted now, would still place them above all the efforts of mind. Conspicuous among these mathematical attainments is the *geometrical analysis*, an invention ascribed to Plato, and which constitutes the power and the glory of the Grecian schools. *Synthesis* was the original and usual mode of the ancient geometry. It consisted in the art of building one elementary truth upon another, commencing with some acknowledged principle, until the problem was solved, or the proposition demonstrated. This method is peculiarly adapted to the communication of acquired knowledge. The genius of Plato conceived the bolder instrument of analysis, a method not possessing the severity and caution of synthetical demonstration, but which at the same time is peculiarly calculated to enlarge the limits of science by the discovery of unknown truths. "The geometrical analysis," says Playfair, "is one of the most ingenious and beautiful contrivances in the mathematics. It is a method of discovering truth by reasoning concerning things unknown, or propositions merely supposed, as if the one were given, or the other were really true. A quantity that is unknown is only to be found from the relations which it bears to quantities that are known. By reasoning on these relations, we come at last to some one so simple that the thing sought is thereby determined. By this analytical process, therefore, the thing required is discovered, and we are at the same time put in possession of an instrument by which new truths may be found out, and which, when skill in using it has been acquired by practice, may be applied to an unlimited extent. A similar process enables us to discover the demonstrations of propositions, supposed to be true, or, if not true, to discover that they are false. This me-

thod (he adds) was perhaps the most valuable part of the ancient mathematics, in as much as a method of discovering truth is more valuable than the truths it has already discovered." *

Apollonius, who graced the school of Alexandria about the period when the career of Archimedes was so violently closed at the siege of Syracuse, and who is thought by some to have more than compensated the world for the loss of the Sicilian philosopher, distinguished himself by a profound application of the ancient analysis. He was born at Perga about 150 years before the Christian era; and while, on the one hand, the grasp of his genius unlocked some of the richest stores of modern research, on the other, his restless ingenuity bestowed upon the ancient system one of the most imposing of its errors. Endowed, like Archimedes, with a mind capable of extracting the latent powers of numbers, but checked and hampered by the feeble notation of the Greeks, he supplied the defect as he best could, from his geometrical resources, and though he stretched the arithmetic of his times beyond its imagined capabilities, it cannot be said that he effected a revolution in that slumbering science. His genius followed a less recondite but more seducing path. The genesis and properties of those curves which are obtained from the cone deeply engaged him whom his countrymen deservedly styled the Geometer *par excellence*. Though generally referred to the school of Plato, the precise origin of this important branch of geometry is not determined. Conic sections have become of infinite value to physical astronomy, since the curves which the planets and comets describe in space, the law of projectiles, and a multitude of physico-mathematical problems have been demonstrated to depend upon their theory. "What," says Montucla, "would have been the ecstasy of Plato, and the geometers of his school, could they have foreseen the demonstration." It is to Apollonius, however, that we are chiefly indebted for this profound and beautiful aid. His treatise on the subject, the most distinguished of his many compositions, almost entitle him to be considered the inventor of that branch of geometry; for while the first books have introduced us to so much of the theory as, we learn from himself, had been known before his time, the latter are undoubtedly the produce of his own genius, and compose the climax of those speculations.

But while Apollonius bestowed this boon upon physical astronomy, and, by his elaborate and profound researches, "had laid the foundation of

* Dissertation.

discoveries which were to illustrate very distant ages," he at the same time, by his celebrated hypothesis of *epicycles* and *deferents*, greatly prolonged the false, though plausible system of the earth's repose amid the revolving stars. The method consisted of a geometrical artifice, by means of which certain celestial observations, difficult to reconcile with the established doctrines of ancient astronomy, were accounted for in a manner which, according to the Greek expression, " saved the phenomena."* It had been observed from the most remote antiquity, that certain planets traversed the Heavens in distracted or perturbed paths, wholly inconsistent with the simple idea of a circle or perfect revolution, an order the ancients were most unwilling to reject. Cumbrous artifices were readily adopted by way of protecting the original supposition of that simple uniform motion. The system of Aristotle and Eudoxes had inclosed the earth within concentric spheres, to whose revolving surfaces the planets were fancifully attached, and through whose crystalline substances their rays were supposed to be transmitted. In the progress of time, this complicated machinery, though not positively discarded, faded from the imagination, and the planets were permitted to describe their airy circles without the leading-strings of the crystalline spheres. But their unequal movements could not escape the observations of the most defective astronomy. Sometimes they seemed to check their career, to become stationary, and, finally, to perform a retrograde motion; and the eternal orbs had thus the appearance of tottering in their gait with the capricious movements of chaos, or the undetermined steps of infant creation. Pythagoras, who long before had caught a glimpse of the truth, failed to establish, though he partly promulgated, the doctrines of the solar system. Apollonius bent his mind to reduce the false terrestrial system within the power and the protection of geometry, and he demonstrated a hypothesis the most ingenious and beautiful that ever served to perpetuate error. He imagined the planets to describe a small circle or orbit round a centre, which centre at the same time described a great orbit round the earth. It is obvious, that, upon this supposition, the planet would assume the phases, sometimes of accompanying the orbit described by the centre of its smaller orbit, and sometimes of a stationary, or even a retrograde opposition. The smaller circle he named

* Milton alludes to this in Paradise Lost.

" To save appearances, how gird the sphere
With centric and eccentric scribbled o'er,
Cycle and epicycle, orb in orb."

epicycle, and the larger one deferent, or that which carried along with it the smaller.

Apollonius was succeeded by Hipparchus, who, notwithstanding the ardour and ingenuity of such researches before his time, deserves to be called the founder of astronomy as a systematic science. No rapid glance can do justice to the value and variety of his speculations. The motions of the most important luminaries, the sun and moon, he detected and demostrated with a perseverance and dexterity worthy of Newton, and thus amended the solar year. He was the first to conceive and execute the stupendous task of forming a catalogue of the stars. He founded the science of trigonometry. With him closed the Pagan era, for he is the last philosopher of great account before the rise of Ptolemy, who flourished in the second century.

Ptolemy, " prince of astronomers," marks a great epoch in the history of science. The Ptolemaic system founded on the labours of Hipparchus, combining all the power and weakness of the ancient geometry, was submerged in the dark ages, and, after that dreary hybernation of letters, reappeared to triumph for a time over truth, and to be invested with the terrors of Rome.

The schools of Alexandria, towards which we have cast a glance so hurried and imperfect, were thus illustrated by men whose names are immortal. Physical inquiry had arrived through a train of brilliant speculations to the basis of Hipparchus, and the system of Ptolemy. The task alone, had he done no more, of enumerating and recording the stars, evinces in the former philosopher a mind equal to any intellectual daring; but the fact, that three centuries of apathy intervened before another philosopher like himself arose in Ptolemy, and that Ptolemy did no more with the resources of his predecessors and his own, than erect a dazzling fabric of error, argues some great defect in the machinery of human investigation.

This defect may be told in a single sentence. It was an age of *geometrical*, rather than of *arithmetical* science. All its boasted analysis was devoted to diagrams and abstract properties of space. The Grecian philosophers were slaves to the rule and compass, and not aware that the pure reasoning in which they delighted, and the elegant constructions they worshipped, were but vain shadows compared with what the human mind was destined to perform with numerical aids. It was in that very department of science where the greatest conquests are to be achieved, the science of arithmetic, that Greece

has least pretensions to rival an era of logarithms. In the weakness of its arithmetic, and the almost vicious refinement of its geometry, lurk the defects which have stampt upon its loftiest monuments the title of *splendide mendax*.

We must not say, however, that the Greeks were destitute of numerical resources. Mathematical investigation is absolutely powerless without some mode of applying the properties of numbers, and such speculations very readily suggest themselves to all stages of civilized humanity. It was impossible that a nation so refined should exhibit none of its genius and ingenuity upon a subject so profound and valuable as the philosophy of arithmetic, and, accordingly, though neither justly appreciated, nor systematically cultivated among them, that science derived illustrious aid from the schools to which belonged Euclid, Archimedes, Apollonius, Ptolemy and Diophantus. The oldest treatise on the theory of arithmetic extant is that comprehended by the seventh, eighth, and ninth books of Euclid's Elements. But to Archimedes we must chiefly turn in this rapid survey, for of all the sages of antiquity he is the one with whom a variety of coincidencies entitle us to compare our own philosopher; and we are the more anxious to do so, because Napier is the solitary being who raises Scotland to that level in the history of science.

Thales and Pythagoras had travelled to the east, from whence, as is said, they enriched their own country with some of the mathematical powers, and more of the mystical properties of numbers. Archimedes, who lived some centuries afterwards, found the arithmetic of the school of Alexandria sufficiently advanced to attract his mind occasionally from the seductions of geometry, in order to attempt new conquests in numbers. The Greeks, who had adopted the decimal scale, ascended so far in their notation as to include the four terms of the progression, *units, tens, hundreds, thousands*; and attained by cumbrous artifices a still further extension, until they could reckon *myriads*. But all their efforts seemed to be paralyzed by the figurative part of their system, which, instead of being composed of symbols exclusively devoted to that purpose, as in the simple but powerful method of Arabic notation, derived its numeral characters from the Greek alphabet, most ingeniously and scientifically combined, but affording very unwieldy and feeble instruments of calculation. For instance, instead of such characters as those now in use, 1, 2, 3, 4, 5, 6, 7, 8, 9, the Greeks employed α, β, γ, δ, ϵ, ς, ζ, η, θ, to express the same quantitative ideas, being the first letters of their alphabet, with one auxiliary sym-

bol, *episémon* intercalated betwixt ϛ and ζ. This was their series of units; but instead of the admirable artifice which forms the peculiar merit of the present method, namely, that which expresses the succeeding series in the denary scale by repeating the same symbols raised to the requisite value by a change of position, the Greeks continued to exhaust their alphabet.

Their defects will be better understood by glancing at the system which now prevails. The Arabic notation is that in which the advance of any of the symbols of unity one step from right to left, has the effect of increasing its value ten times, in other words, of multiplying it by ten. But if this were done in empty space, so as to leave no trace of the starting point, the change of position would not be perceptible. To obviate this difficulty, a circular figure or cypher, expressive of no value in itself, and consequently termed *nothing*, is used for the purpose of indicating that original position. In this manner, 10 comes to signify ten, because the cypher indicates that the unit has been advanced a step from right to left, and consequently has increased tenfold. It is not the *addition* of the circle which gives the increased value, (a view of this personification of nothing which might vaguely present itself,) for *nothing* added to *one* leaves *one* still, but it is the relative position to which the expressive unit has been shifted. Any of the series of units advanced in like manner obtains its corresponding increase. 20 is 2 advanced tenfold; in other words, *twenty*. But the circle to supply the vacant place becomes unnecessary when any original value of the digits is to be added to the acquired value of the digit advanced; 11 indicates one ten and one unit; 22, two tens and two units; in other words, *eleven*, and *twenty-two*. The infinite extension of this system is obvious upon the slightest inspection of its principle. And such is the rapid wing, so elegant in its simple construction, so powerful to make its way, which, flitting through the very bosom of the dark ages, came to the aid of regenerated science from some distant and doubtful clime of the east,—some *chiaroscúro* land of science and superstition. How gladly would the genius of Archimedes have hailed this bird of glorious promise! but it came not to the schools of Alexandria.

To express the second term in their denary scale, that is, the series of tens, the Greeks continued to draw upon their alphabet, and selected the letters ι, κ, λ, μ, ν, ξ, ο, π, and the auxiliary symbol termed *koppa*, to signify 10, 20, 30, 40, 50, 60, 70, 80, 90. The ascending term of hundreds, 100,

200, 300, and so on to 900, was expressed by the letters ϱ, σ, τ, υ, φ, χ, ψ ω, and the third auxiliary intercalation termed *sampi*.* In this state of their scale, the greatest number that could be noted was only nine hundred ninety-and-nine, being the sum of the highest expressions in each progression. To obtain the progression, 1000, 2000, &c. up to 9000, the nine characters of the progression of units were repeated with a mark below each, thus: $\underset{,}{\alpha}, \underset{,}{\beta}, \underset{,}{\gamma}, \underset{,}{\delta}, \underset{,}{\varepsilon}, \underset{,}{\varsigma}, \underset{,}{\zeta}, \underset{,}{\eta}, \underset{,}{\theta}$. This extended the grasp of their notation to nine thousand, nine hundred, ninety-and-nine. The series of myriads, or tens of thousands, was obtained by placing the initial letter M under any number, to the effect of giving it that value. Thus, $\underset{\alpha}{\text{M}}$ signified one myriad or 10,000; $\underset{\beta}{\text{M}}$, two myriads, or 20,000, &c. Two dots placed over the symbol or character were sometimes used for the same purpose.

The system of Greek notation,—thus limited to the expression of myriads by devices, which, though sufficiently ingenious and effective to be not unworthy of that enlightened people, were cumbrous and deficient in the hands of philosophers,—betrayed some of them into the crude proposition, that no combination of numbers was sufficient to express the quantity of the grains of sand composing the shores of the ocean. This idea arose directly from that defect in their notation, which limited any distinct numerical expression to the quantity of *myriads* or ten thousands. The mind of Archimedes, like that of Napier, surrounded with difficulties, and driven upon its own resources, always led him to attempt either what others had never dreamt of, or what they deemed impossible. He immediately set himself to refute this confident assertion, and his somewhat Quixotic determination was crowned by results far beyond the utility of that particular refutation. It gave birth to the ARENARIUS, a beautiful treatise, which extended the feeble notation of the school of Alexandria, or at least demonstrated the power of doing so, approaching, at the same time, the confines

* There were only twenty-four letters in the Greek alphabet, and their scale required twenty-seven. The Greeks, therefore, added three intercalations or auxiliary marks. Before the improvement of dividing their alphabet into three distinct classes, the Greeks had another very feeble method, which I have not thought it necessary to explain. There were also some varieties and modifications of their arithmetical language which I have not mentioned. The reader who wishes to be minutely informed on the subject, will find what he wants in the edition of Archimedes's works, with a learned Latin commentary, printed at Paris, 1615. Also Delambre's *Astronomie Ancienne, Arithmétique des Grecs.*

of some of the most precious secrets of arithmetical science, and affording an impulse whose career would have left geometry far behind, had barbarian conquests not checked its progress. This work is addressed to Gelo, the eldest son of the King of Sicily, the philosopher's relative, and commences with the following address:—"There are some, O Prince Gelo, who imagine that the sands are innumerable! I speak not of the sands of Syracuse, or of those which are spread upon the shores of Sicily, but of the sands of the whole world. Others, again, believe that the grains are finite, but that numbers cannot express them! If the earth itself were composed of sand, whose particles rose to the summits of her mountains, and filled the abysses of the deep, such reasoners would find still greater difficulty in persuading themselves that those sands could be numbered. But I will shew, and by geometrical demonstrations to which you must bow, that in a system of numbers of my own, which I formerly addressed to Zeuxippus, a progression may be found, exceeding not merely the grains of a sphere equal in bulk to the earth, but even to that of the whole universe." It is not, however, the geometrical demonstrations of Archimedes, but his knowledge and command of *numerical progressions*, which here call for our attention; and as this knowledge forms one grand coincidence betwixt his mind and Napier's, it may be proper to afford a popular explanation of the term.

"The physical world," says an elegant and distingnished writer, "is a system of progressions; time is composed of moments added to moments; animal existence is made up of the progressions of nature, advancing by steps more or less perceptible, from the inanimate molecule, to the animated being honoured with the light of immortality. There are degrees in all the properties of nature, passing through fine gradations, from one extreme to the other. It is nature whom we imitate in the *arithmetical progression*, ceaselessly *adding* number to number till, like her, we mount the scale by equal steps from zero, and rise from nothing to infinity. When the human mind passes from *addition* to *multiplication*, it has attained a new method of progressing towards infinity. In ceaselessly *multiplying* one number by another, we advance by steps still equal, but more hurried, more rapid. Such is the *geometrical progression*."*

To afford a more practical illustration than this beautiful passage, suppose a series of numbers either to increase or decrease in such relative proportions, that the difference betwixt any two of the numbers, which are together,

* Histoire de l'Astronomie Moderne, par M. Bailly.

shall be the same throughout; this will be an *arithmetical* progression. The simplest example is afforded by a progression continually increasing by unity from nothing. Thus, 0, 1, 2, 3, 4, 5, 6, 7, 8, &c. is a progression where the difference betwixt any two consecutive terms throughout is 1. Again, take another increasing series bearing this relative proportion, that every term is the product of the one immediately preceding, by a common multiplier, and you have a *geometrical* progression. Thus, 1, 2, 4, 8, 16, &c. is an increasing progression, where each term multiplied by 2 gives the succeeding one. The examples in both cases might be varied by adopting other series with the same characteristics, such as 1, 5, 9, 13, &c. where the difference is always 4; and 1, 10, 100, 1000, where the multiplication proceeds by 10. In other words, the *arithmetical* progression advances in this instance by the uniform addition of 4 to the last term, and the *geometrical* is propagated by the products of the continual multiplication of the last term by 10. Simple, and almost puerile as these explanations may appear, they involve principles which, in the possession of Archimedes, raised the languid arithmetic of the Greeks to a capacity for great adventure, but in that of Napier, created a revolution in science; and even this simple statement of them will soon find an excuse as we proceed in the illustration of our own philosopher's intellectual achievements, where, in the words of Bailly, "*tout est progression.*" It is in the properties and relative analogies of these characteristic series of numbers, that the mighty powers of calculation lurk; and we have now to consider how far those powers were developed by Archimedes in the *Arenarius.*

The expedient of the initial letter M having enabled them to note myriads, with this extension of the system, the Greeks could express anything below *ten thousand* times *ten thousand*; in other words, the limit of their notation was the myriad of myriads. In this state Archimedes found it, and, of course, when he undertook to demonstrate the possibility of expressing a number equivalent to the contents of the vast sphere he imagined, he was under the necessity of extending the scale of notation from this limited to an indefinite grasp. The profound views he entertained of progressions and their properties enabled him to effect his purpose, and in doing so he touched more than one principle in arithmetical science, which, had he mastered them, would have completely unfettered that wing of the mathematics.* In the existing state of the notation he proposed to extend, it was not difficult for a mind like his to perceive that the

* It was a saying of Plato, that Arithmetic and Geometry are the two wings of the Mathematics.

scale ascended in a geometrical progression, of which the ratio or common multiplier was 10. In order to demonstrate the indefinite grasp of these powers, he continued the geometrical progression by taking its limit, a myriad of myriads or ten thousand times ten thousand, as the unity of a second order of numbers, ascending in the same geometrical progression by ten, from myriads of myriads as the unity, up to myriads of myriads of this extended progression. This he again took as the unity of a third order, and so on through eight periods, until he obtained a power of notation equivalent to 64 places of the Arabic numerals. To form a just notion of Archimedes's command of the philosophy of numbers, and also of the comparative excellence of Napier as evinced by his theory of Logarithms, we must have a distinct idea of what the former proposed in the Arenarius, and of the extent to which he carried his observation of the properties of progressions. We shall, therefore, assist what has been stated above by an example, taking the aid of the notation now in use.

Their alphabet and auxiliary symbols, with the other devices, gave the Greeks the command of a decuple scale of eight terms, viz. units, tens, hundreds, thousands, myriads, tens of myriads, hundreds of myriads, thousands of myriads, which in our notation would be expressed :—

Units, - -	1
Tens, - - -	10
Hundreds, - -	100
Thousands, - -	1,000
Tens of thousands, - -	10,000
Hundreds of thousands, -	100,000
Millions, - - -	1000,000
Tens of millions, - -	10,000,000

Archimedes took this progression as the *first order* of a *period* which he supposed to contain eight orders, each composed like the above of eight terms. This first order he named an *octade of the first.* To form his *octade of the second,* he took the eighth term of the first octade multiplied by ten, which gave him *myriads of myriads,* and this was no arbitrary acceleration, because it was the very next term in a decuple geometrical progression. Thus, myriads of myriads became the unity of a second octade; and, therefore, that which Archimedes proposed to name *a unity of an octade of the second,* would represent myriads of myriads, *i. e.* an hundred millions. The highest term of

this new octade was equivalent in our notation to 16 figures, or 1 and 15 cyphers annexed; thus,

Octade of the Second.

Units,	100,000,000
Tens,	1,000,000,000
Hundreds,	10,000,000,000
Thousands,	100,000,000,000
Myriads,	1,000,000,000,000
Tens of myriads,	10,000,000,000,000
Hundreds of myriads,	100,000,000,000,000
Thousands of myriads,	1,000,000,000,000,000

This last term, *thousands of myriads of the octade of the second*, (or, as we would name it, one thousand billions,) multiplied by ten, became in like manner the unity of an *octade of the third*. Eight of these octades were to compose a period, and the highest number of the *octade of the eighth*, which closed the period, would be equivalent to the expression with us of 1 and 63 cyphers annexed. Thus, by adding period to period, Archimedes could extend the expression of his scale *ad infinitum*. But his first period of octades was sufficient for his problem. Taking not merely the sphere of the world for the bulk of sands, but considering the whole universe as such a sphere, he was able, from his geometrical resources and the abstract power of his mind, to bring the contents of this imaginary sphere, by approximating steps, within the grasp of measurement and calculation; and thus he demonstrated, that this inconceivable volume of sand did not contain so many grains as would be expressed by the *eighth term of the octade of the eighth*, or, as we would say, *one thousand decillions*, a number beyond the grasp of the human mind, but not of notation. *

* Our scale of notation, when divided from right to left into periods of six figures each, gives *units, millions, billions, trillions, quadrillions, quintillions, sextillions, septillions, octillions, nonillions, decillions*, &c. Now Archimedes's approximate result was one thousand decillions, or

1000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000.

This affords a good illustration of the simplicity and power of Arabic numerals. The single unit moved from right to left in a decuple scale by as many proportional steps as the vacancies or cyphers indicate, gives a mathematically accurate notation of a numerical power which cannot be appreciated even by comparison. For instance, it can be demonstrated, that if a thousand persons employed to reckon money, were each to reckon a hundred pieces in a minute, and work at that rate for ten hours a-day, they would take forty-five years to reckon a *billion*.

Archimedes differed from Napier in this, that our philosopher loved calculation as the light of day, whereas the Sicilian, being a philosopher of the geometrical school of Alexandria, only loved it as a cat loves the brook, into which she will dip her paw for the sake of a fish. But we must sympathize with the immortal author of the Arenarius, when we call to mind that he had not the Arabic notation, and that all this tremendous gallop of octades was not rendered easy and pleasant to him by the simple, but omnipotent expedient, of the same symbol expressing a decuple progression to any extent merely by a progressive change of place, leaving a mute mark behind it to indicate each step of its advance. The cumbrous and weak combinations of the initial M, or Mv, were little better than the confused repetitions of a child, who might say myriads of myriads of myriads to express what it could not conceive; and the characteristics of the most simple arithmetical operations of that illustrious school were labour and imperfection. "The procedure of the Greek arithmeticians," says Professor Leslie, "was necessarily slower and more timid than our simple, yet refined mode of calculation. Each step in the multiplication of complex numbers appeared separate and detached, without any concentration, which the moderns obtain by carrying forward the multiples of ten, and blending together the different members of the product. In ancient Greece, the operations of arithmetic, like writing, advanced from left to right; each part of the multiplier was in succession combined with every part of the multiplicand; and the several products were distinctly noted, or, for the sake of compactness, grouped and conveniently dispersed till afterwards collected into one general amount."

Profound, therefore, as were the conceptions of Archimedes in the philosophy of arithmetic, he looked askance at calculation as a labour which he loved not, and fain would avoid. But it is remarkable, and most interesting to observe, that the very struggles of this great *geometrical* mind to escape from such operations, brought it to the verge of all that is most valuable in arithmetical science. The object of the Sicilian was to obtain such abstract powers, as would give him the grasp of numbers, by a geometrical consideration of their properties, and, at the same time, save him from the torture of calculation. Nothing was better suited to his purpose than the doctrine of progressions; and it is obvious that his system of octades was just an indefinitely extended geometrical progression, so classed or divided, indeed, as to facilitate notation, but pos-

sessing, at the same time, those abstract properties of an uninterrupted series of proportionals, which enabled him, as a geometrician, to detect and to point out results, without actually performing any of the calculations. So it happens, that the profound and elegant monument of his genius which we are considering, possesses the anomalous merit of conveying to the mind a mathematical idea of the number of the sands of the ocean, and infinitely beyond them, without executing any arithmetical operations. In achieving this it was, that Archimedes touched the bases of three great pillars of modern calculation, the system of Arabic notation, the Logarithms, and the language of Algebra; and thus, unconsciously, he was at the sources of modern science, before which his own beloved geometry has fallen from her throne, and now lies like a broken mirror, unfit to reflect a true image of the Heavens, though still dazzling us with the glories of ancient Greece.

In the first place, it is obvious that the classification proposed in the Arenarius is quite analogous to that so universal now, a fact which the following tree of our notation will at once present to the eye.

&c.
Hundred thousand of billions, 100,000,000,000,000,000
Ten thousand of billions, 10,000,000,000,000,000
Thousand of billions, 1,000,000,000,000,000
Hundred billions, 100,000,000,000,000
Ten billions, 10,000,000,000,000
Billions, 1,000,000,000,000

Hundred thousand of millions, 100,000,000,000
Ten thousand of millions, 10,000,000,000
Thousand of millions, 1,000,000,000
Hundred millions, 100,000,000
Ten millions, 10,000,000
Millions, 1,000,000

Hundred thousands, 100,000
Ten thousands, 10,000
Thousands, 1000
Hundreds, 100
Tens, 10
Units, 1

This is just a decuple geometrical progression ascending *ad infinitum*, and the same in which Archimedes detected the principle of logarithms. The Greek notation, from the very fact of being so imperfect, varied in its character,* and the more simple the expedients for raising the value of the digit became, the nearer they approached to the invaluable simplicity of the cypher. Thus α was the unity, α, increased by the subscribed mark to the value of a thousand; the next multiplication was expressed by M, or Mυ; had they merely added another mark below the letter, so much would have been gained, and the idea would have more readily suggested itself of throwing aside auxiliary marks entirely, and making a few symbols answer all the purpose, even in an infinite scale, by a change of place. The very philosophy of progressions might have led Archimedes to this beautiful aid of his decuple system,—a philosophy so simple, yet so powerful; "mais ces moyens simples sont le fruit des idées profondes et lumineuse; tout est progression dans le monde physique." Had he done so, he would have added the Arabic notation to the denary system, and have been the father of arithmetic. The difference betwixt his mind and Napier's seems to be this, that the latter would in like manner have denied the proposition that numbers could not grasp the sands of the sea, and have set himself to demonstrate the contrary; he, too, (as he did) would have developed the properties of progressions; but, instead of shunning the numerical operations, or clinging to his geometry, he would have hailed the dawn of the science of calculation, have instantly attacked the tyranny of notation, and most probably reduced it to the present simplicity of its elements, for we shall find, that to *simplify notation* was a propensity of Napier's mind, whose characteristic, *in prudentia et simplicitate*, is descriptive of the nature of Arabic numerals.

In the second place, Archimedes, anxious, not to perfect the science of calculation, but to avoid its difficulties when having to deal with such a scale, observed and demonstrated certain properties inherent in the principles of its construc-

* This will be seen by comparing M. Delambre's "Arithmétique des Grecs," as forming the first chapter of his "Astronomie Ancienne," 1817, with the same treatise, as given by M. Peyrard at the conclusion of his Œuvres d'Archimède. The Greek notation is different in the corresponding passages of the separate editions, and there are other discrepancies perplexing to the student. Compare Tome ii. p. 8 of Delambre's works, with Tome ii. p. 524 of Peyrard, Edit. 1818.

tion, which enabled him to find the place, and consequently the value, of any *term* in that progression, without the labour and difficulty of generating it by actual calculation. Here he reached the base of the Logarithms; but, totally unconscious of the superstructure he might have reared, and entirely engrossed with his particular problem and his race of octades, he left that immortal conquest to slumber unachieved through the dark ages. As his statement of the principle, however, is essential to the history of Logarithms, we shall give it here.

"It is also of some use" (says Archimedes) "to know this property. If a series of numbers be arranged in geometrical progression from unity, and any two of the terms of that progression be multiplied together, the product will also be a term in the same progression; and its place will be at the same distance from the larger of the two *factors* that the lesser *factor* is from unity; and its distance from unity will be the same, *minus one*, that the *sum* of the distances of the two *factors* from unity is distant from unity. For, let A, B, C, D, E, F, G, H, I, K, L, represent any geometrical progression from unity, of which A is the unity; let D be multiplied by H, and let X [the unknown quantity,] represent the product. Take L in the given progression, which is at the same distance [or number of places,] from H that D is from unity. It is to be demonstrated that X is equal to L. Because, since in a geometrical progression D is at the same distance from A that L is from H, D is in the same ratio to A that L is to H. But A multiplied by D gives D; and likewise H multiplied by D gives L; therefore X is equal to L. It is demonstrated, therefore, both that the product is a term in the same progression, and that it is at the same distance from the larger *factor* that the lesser is from unity. It is also demonstrated, that this product is at the same distance from unity, *minus one*, as the sum of the distances of the *factors* from unity; for A, B, C, D, E, F, G, H, are as many terms as H is distant from unity, and I, K, L, are less by one than the number of D from unity, but with H they are equal to that number." *

* Χρήσιμον δέ ἐστι καὶ τόδε γιγνωσκόμενον. Εἶπα, ἀριθμῶν ἀπὸ τᾶς μονάδος ἀνάλογον ὄντων, πολλαπλασιάζοντες τινὲς ἀλλάλως τῶν ἐκ τᾶς αὐτᾶς ἀναλογίας· ὁ γενόμενος ἐσσεῖται ἐκ τᾶς αὐτᾶς ἀναλογίας, ἀπέχων ἀπὸ μείζονος τῶν πολλαπλασιαξάντων ἀλλάλως, ὅσος ὁ ἐλάσσων τῶν πολλαπλασιαξάντων ἀπὸ μονάδος ἀνάλογον ἀπέχει· ἀπὸ δὲ τᾶς μονάδος ἀφέξει ἑνὶ ἐλάσσονας, ἢ ὅσος ἐστὶν ἀριθμὸς συναμφοτέρων, ὥς ἀπέχοντι ἀπὸ μονάδος οἱ πολλαπλασιάξαντες ἀλλάλως. Ἔσων γὰρ ἀριθμοὶ τινὲς ἀνὰ λόγον ἀπὸ μονάδος,

We have given a literal translation of this passage in the *Arenarius*, with the original below, because it is the first statement on record of the fundamental principle of Logarithms; not, indeed, of *the Logarithms* in reference to their discovery, but it is that principle or property which suggested the value of such a discovery, though it did not aid the accomplishment. Archimedes detected the property simply in its application to his own scale, as indicating the place of any product of its terms; but it never entered into his imagination that tables of numbers could be demonstrated and constructed, so as to render that of *universal* application which saved him the trouble of calculation in his problem. To demonstrate the property and its value as applied to a particular progression, was the merit of Archimedes. To imagine that NUMBERS might be brought into such a state, as to be subservient to that principle, and then to bring them to that state, was the conquest achieved by Napier. In the one case, the discovery was merely a philosophical detection of certain analogies, which no philosopher, busy with such progressions, could have failed to observe; a discovery, in short, which can add nothing to the fame of Archimedes. In the other case, as we shall find when we come to examine more particularly the nature of Logarithms, the discovery involved an original conception, which, when we say that Archimedes did not form it, we have said enough to prove, that it was such as the detec-

οἱ Α, Β, Γ, Δ, Ε, Ζ, Η, Θ, Ι, Κ, Λ, μονὰς δὲ ἔςω ὁ Α· καὶ παραπολλαπλασιάϑω ὁ Δ, τῷ Θ· ὁ δὲ γενόμενος ἔςω ὁ Χ. Εἰλήφϑω δὴ ὁ ἐκ τᾶς αὐτᾶς ἀναλογίας ὁ Λ, ἀπέχων ἀπὸ τοῦ Θ τοσάτυς, ὅσυς ὁ Δ ἀπὸ μονάδος ἀπέχει. Δεικτέον ὅτι ἴσος ἐςὶν ὁ Χ τῷ Λ. Ἐπεὶ ἓν, ἀνάλογον ἰόντων, ἴσον ἀπέχει ὅτε Δ ἀπὸ τοῦ Α, καὶ ὁ Λ ἀπὸ τοῦ Θ, τὸν αὐτον ἔχει λόγον ὁ Δ ποτὶ τὸν Α, ὃν ὁ Λ ποτὶ τὸν Θ. Πολλαπλασίων δὲ ἐςὶν ὁ Δ τοῦ Α τῷ Δ. Πολλαπλασιων ἄρα ἐςὶ καὶ ὁ Λ τοῦ Θ τῷ Δ. Ὡς τε ἴσος ἐςὶν ὁ Λ τῳ Χ. Δῆλον ἓν ὅτι γενόμενος ἐκ τᾶς αὐτᾶς ἀναλογίας τε ἐςὶν, καὶ ἀπὸ τοῦ μείζονος πολλαπλασιαξάντων ἀλλάλας ἴσον ἀπέχων, ὅσυς ὁ ἐλάτλων ἄπὸ τᾶς μονάδος ἀπέχει, Φανερὸν δὲ, ὅτι καὶ ἀπὸ μονάδος ἀπέχει ἑνὶ ἐλάτλονας ἢ ὅφος ἐςὶν ὁ ἀριϑμὸς συναμφοτέρων οὓς ἀπέχοντι ἀπὸ τᾶσ μονάδος. Οἱ δὲ μὲν γὰρ οἱ Α, Β, Γ, Δ, Ε, Ζ, Η, Θ, τοσοῦτοί εἰντὶ ὅσυς ὁ Θ ἀπὸ μονάδος ἀπέχει· οἱ δὲ Ι, Κ, Λ, ἑνὶ ελάτλονες, ἢ ὅσυς ὁ Δ ἀπὸ μονάδος ἀπέχει. Σὺν γὰρ τῷ Θ, τοσοῦτοι εἰντί.—*Oxford edit. of the works of Archimedes*, p. 326.

We are indebted to Professor Peyrard for sending us to the original, though after much puzzling over his translation, from not being inclined to doubt the accuracy of an "ouvrage approuvé par l'Institut, et adopté par le gouvernement pour les Bibliothèques des Lycées. Dédié à sa Majesté l'Empereur et Roi. Seconde edition." He thus concludes Archimedes's demonstration, "En effet, le nombre des termes A, B, Γ, Δ, E, Z, H, Θ est égal au nombre des terms dont Θ est éloigné de l'unitié; et les nombre des termes I, K, Λ est plus petit d'une unité que le nombre des termes dont Θ est éloigné de l'unité, puisque le nombre de ces termes avéc Θ est égal au nombre des termes dont Θ est éloigné de l'unité." This is unintelligible.

tion of the property did not necessarily lead to; it also involved the *verification* of that sublime idea, by demonstration and computation more than equal to any difficulty which Archimedes ever conquered. The Sicilian, then, being a geometer *par excellence*, anxious to shake himself loose from calculation, and not at all to attempt to turn any property of numbers to such account as to create a revolution in arithmetical science, missed the discovery of Logarithms, as he missed the discovery of Arabic notation; and he did so, without bequeathing to Napier such aid as, for instance, even Newton obtained towards his conquests in the geometry of infinites, from Wallis's *Arithmetic of Infinites*.

We have now to add, in the third place, that when Archimedes made use of certain arbitrary signs or characters, to represent any given progression of the nature he required, as A, B, Γ, Δ, E, &c. for the given quantities, and X for the unknown, he struck a note prophetic of a vast revolution in the language of science. Geometrical constructions and arithmetical calculations exhibit the actual values of the magnitude or quantities upon which they are brought to bear, and these operations are apt to become painfully unwieldy. This gave birth to algebra, which "was a contrivance merely to save trouble; and yet to this contrivance we are indebted for the most philosophical and refined art which men have yet employed for the expression of their thoughts. This scientific language, therefore, like those in common use, has grown up slowly from a very weak and imperfect state, till it has reached the condition in which it is now found." * Its perfection consists not merely in representing quantities by conventional symbols instead of the natural signs, but also expressing, in an abbreviated form, the operations performed, or supposed to be performed, on those quantities. It is obvious, therefore, that Archimedes had made no advance in this refined art; but still he touched the principle, a fact sometimes overlooked. The distinguished author who has just been quoted, in tracing the progress of science after the revival of letters, says, "Vieta was the first who employed letters to denote the known as well as the unknown quantities, so that it was with him that the language of algebra first became capable of expressing general truths, and attained to that extension which has since rendered it such a powerful instrument of investigation." But in the Arenarius, the ancient geometer afforded a hint, at least, of that language, by using letters to represent both the known quantities of his pro-

* Playfair.

gression, and the unknown product of which he was in quest; and these are just algebraic signs, or *cossic numbers*, as they have since been denominated.*

When the *statics* and *catoptrics* of Archimedes were found irresistible, the Roman General Marcellus turned the siege of Syracuse into a blockade. Its inhabitants felt too secure in their wonderful resources, and the philosopher himself returned to his geometry. The city was taken by surprise, and its protector only became aware of the fact when the rude voices of the Roman soldiers interrupted his studies with an order to appear before Marcellus. The Sicilian is said to have been lying on the ground at the time, intent upon a diagram: "I will come," said he, "when I have finished my problem,"—and the soldier plunged his sword into the philosopher's bosom. So perished Archimedes, two centuries before the Christian era. A sphere within a cylinder was engraved upon his tomb, in conformity to a desire he had once expressed when exulting in a geometrical conquest.

Apollonius succeeded him, and the arithmetic of the Greeks was improved by that philosopher in the proportion that he simplified the notation. But all his improvements were modifications of the system of his predecessor, and his rules for ameliorating calculation arose from the properties pointed out by Archimedes. Apollonius approximated, however, still nearer to the present system of notation; but the simple expedient of the cypher still eluded the grasp of his mind, and the Logarithms were left undisturbed.

The recovered remnants of ancient science are so scattered and imperfect, that no accurate estimate can be formed of the extent to which the impulse prevailed which Archimedes, Apollonius, and Ptolemy bestowed upon the science of calculation. There are some indications that both arithmetic and algebra attained to greater perfection before the barbarian conquests than is generally supposed; and although nature for a time seemed as if exhausted by the production of such philosophers, yet, in the progress of those centuries

* Wallis ("bon juge en ces matièrs," says Montucla) notices the fact particularly, as one of interest and historical value: "Quanquam enim *Numerorum Cossicorum* (quod jam dici solet) seu *Denominatorum*, aut *Algebricorum* Nomina, jam recens introducta censeantur, vel ab Arabibus, vel à recentioribus Græcis, (inter quos eminet *Diophantus*) post *Euclidis*, et *Archimedis* tempora: res tamen ipsa jam olim obtinuit, estque in his Archimedies numeris, A, B, Γ, Δ, &c. conspicua," &c.—*Notæ in Arenarium.*

which were still to see the uninterrupted light, men arose whom science might well be proud to call her sons. With Hipparchus, whom we have already noticed, closed the *first* school of Alexandria; Ptolemy and his system mark the rise of the *second*. This great astronomer was thrown too frequently upon difficult calculations not to benefit by the system of Archimedes, and in his hands it was considerably enriched. He applied with great effect to his astronomical researches, the *sexagesimal* arithmetic, arising out of the division of the circle, (following the ancient year,) into three hundred and sixty degrees, the radius being held equivalent to sixty of those degrees. The sexagesimal scale proceeded upon the same principles as the scale of Archimedes, but followed a descending instead of ascending ratio. Ptolemy was even led to the occasional use of the letter *o* to indicate a blank in the scale, and we thus see the tendency of the Archimedean system of notation to that now in use, and the gradual and near approach to a treasure which those ill-fated schools were destined never to attain.

About the middle of the sixteenth century, however, a Greek fragment was discovered in the Vatican, which proves, that, before the fall of letters, the science of calculation had reared its head so high as to threaten the throne of geometry. *Diophantus*, among the last who may be named with the most illustrious of his country, seems to have escaped that inordinate love of diagrams, which constituted the effeminacy of Grecian science, and composed a work of thirteen books upon arithmetic, whose fragments have occupied the closest attention, and demanded all the illustrative power of such profound modern algebraists as *Bachet* and *Fermat*. We thus see the mathematics of that age struggling painfully, but not in vain, to unfold their most powerful wing. A proportional advance in logistic from the system of Ptolemy would have developed the Arabic notation; a successor to Diophantus, in *decuple* ascending progression, might have achieved the Logarithms. But other conquests were now to prevail, and the star of science waned. As if the coming night had cast its shadow before, the successors of Diophantus seem to have anticipated the approach of the dark ages, and, instead of pressing onwards in the vast field of discovery, devoted themselves to the task of collecting and elucidating the works of others. To the mathematical collections of Pappus of Alexandria our own age is indebted for the knowledge of such sublime resources as the geometrical analysis, and the conics of Apollonius. His friend and colleague,

Theon, left a Commentary on the Almagest of Ptolemy, and was otherwise distinguished; but, strange to say, his fame is almost eclipsed by that of his daughter. Hypathia is a rare instance of her sex not only devoted to the silent abstraction of mathematics, but so successful in her studies, as to rank with the immortal philosophers of Greece. She, too, watched with star-like fidelity the closing gates of light, and gemmed like a planet the departing day of Grecian philosophy. Apollonius, Ptolemy, and Diophantus, received the homage of her commentaries.

How lived—how loved—how died she?

The fate of Hypathia is not left to conjecture. Cyril, a Christian bishop, and his fanatical monks, are accountable for her barbarous murder, which inflicted the last mortal stab upon the expiring school of Alexandria. "He (Cyril) prompted or accepted the sacrifice of a virgin who professed the religion of the Greeks, and cultivated the friendship of Orestes. Hypathia, the daughter of Theon the mathematician, was initiated in her father's studies. Her learned comments have elucidated the geometry of Apollonius and Diophantus; and she publicly taught, both at Athens and Alexandria, the philosophy of Plato and Aristotle. In the bloom of beauty, and in the maturity of wisdom, the modest maid refused her lovers, and instructed her disciples. The persons most illustrious for their rank or merit were impatient to visit the female philosopher, and Cyril beheld with jealous eye the gorgeous train of horses and slaves who crowded the door of her academy. A rumour was spread among the Christians, that the daughter of Theon was the only obstacle to the reconciliation of the prefect and the archbishop, and that obstacle was speedily removed. On a fatal day, in the holy season of Lent, Hypathia was torn from her chariot, stripped naked, dragged to the church, and inhumanly butchered by the hands of Peter the reader, and a troop of savage and merciless fanatics. Her flesh was scraped from her bones with sharp oyster shells, and her quivering limbs were delivered to the flames. The just progress of inquiry and punishment was stopped by seasonable gifts; but the murder of Hypathia has imprinted an indelible stain on the character and religion of Cyril of Alexandria." *

The connection of Logarithms with the first of the regenerated sciences, is,

* *Gibbon's Decline and Fall of the Roman Empire.*

perhaps, the proudest view that can be taken of them; and certainly the least fallacious test of the author's claims, is the instant and ardent homage paid to his genius by philosophers greatly distinguished in rearing the pillars of that most sublime of human monuments, physical astronomy. That Napier was the one destined to create the first important revolution in the means of inquiry which after the dawn of letters enabled the new world of science to surpass the old, was to a certain extent perceived the moment his work became known, though it was impossible to foresee the refined resources of the Newtonian era, to which logarithms are so admirably subservient. To the English translation of the Canon Mirificus, which passed through the author's own hands in manuscript, and received his most cordial *imprimatur*, many commendatory poems are attached, after the fashion of his times, evincing a more than usual excitement and enthusiasm. One of them has the following quaint verses, in which some of the lines would not discredit Spencer.

Pull off your laurel rayes, you learned Greekes,
Let ARCHIMED and EUCLID both give way,
For though your pithie sawes have past the pikes
Of all opponents, what they e'er could say,
And put all moderne writers to a stay,
Yet were they intricate, and of small use
Till others their ambiguous knots did loose.

And bonnets vaile, you Germans! RHETICUS,
REIGNOLDUS, OSWALD, and JOHN REGIOMONT,
LANSBERGIUS, FINCKIUS, and COPERNICUS,
And thou PITISCUS, from whose clearer font
We sucked have the sweet from Hellespont.
For were your labours ne'er composed so well
Great NAPIER'S worth they could not parallel.

By thee great Lord we solve a tedious toyle,
In resolution of our trinall lines,
We need not now to carke, to care, or moile,
Sith from thy witty braine such splendor shines,
As dazels much the eyes of deepe divines.
Great the invention, greater is the praise,
Which thou unto thy nation hence dost raise. *

We have here a catalogue of those worthies, who before Napier's time, and after the dawn of letters, were laying the foundations of physical

* *Thomas Bretnor, Mathem.* 1616.

astronomy. Their labours we must first shortly notice, and then turn to those *Dii majorum gentium* who were toiling to rear the superstructure, when Napier appeared to claim for Britain an equal place in that bright page of history to which their names belong. Let us not, however, as we pass, forget *Gerbert the monk*, more honoured in that simple appellation than even in the title he afterwards attained of Pope Silvester the second. While the science of Greece lay quenched in the dissolution of the Roman Empire, and her very language was forgotten, the Arabs in the East, and the Moors in Spain reaped the honour of preserving both from utter extinction. Gerbert, a Benedictine, disgusted with the ignorance of the monkish schools of Europe, sought science in the Moorish Institutions, rich in Arabic versions of the old philosophers. He returned like a laden bee, and among his stores appeared the Arabic notation, which was more than the Greeks themselves had possessed. Whether India or Arabia gave birth to the system has baffled all inquiry, and the human being who conceived it was destined never to obtain the honour his name deserves. It is the first great revolution in the arithmetic, and consequently in the science of Europe, and was introduced so early as the tenth century, long before the boon could be well appreciated. Centuries elapsed, however, before Arabic numerals came into active operation, and the claims of their alleged importer are not very distinctly established. He acquired the character of a magician, but escaped the faggot, to reach the loftiest throne in Christendom, that of Antichrist, which the next great benefactor of calculation held in such abhorrence. While darkness still prevailed, another treasure was brought to Europe from the east, ostensibly of Arabian birth, but now, like the last, generally referred to India. Leonardo of Pisa brought home, with his merchandise, the science of algebra about the commencement of the thirteenth century; but " the language was very imperfect, corresponding to the infancy of the science, the quantities and the operations being expressed in words with the help only of a few abbreviations." * These were the resources awaiting philosophers whose high destiny was to restore science to a mightier throne than the one she had lost. But, notwithstanding such valuable acquisitions, the great work of restoration can only be said to have commenced in the fifteenth century, nor was it until the following (in which Napier was born) that the invention of printing began to

* Playfair.

have a decided influence on the progress of letters. These historical facts must be kept in view in order fully to appreciate the merit of our own philosopher, or the rank he holds in the history of science. We must also remember how long it was ere the light so slowly expanding over the continent could reach our less favoured island, and that, while its genial warmth was still almost exclusively confined to the cradle of modern astronomy, an independent ray burst from the least propitious quarter of Britain, whose effect was to consummate what had been achieved elsewhere. We have hastily reviewed, in reference to mathematical conquests, that first great period, in the history of science, whose characteristic is the exclusive prevalence of geometrical methods; a period when the absence of those connecting links which now unite mathematics and physics was like the separation of soul and body. Unquestionably the greatest men, in an intellectual point of view, whom the world has ever produced, are those who contributed most largely, not merely to the restoration of letters, but to the memorable revolution which has reared physical science upon the basis of calculation. Considering that Euclid wrote on arithmetic, and how nearly Archimedes had unlocked the treasures of logistic, it is no slight commendation of Napier to exclaim "Let Archimed and Euclid both "give way;" but the praise is still higher, "and bonnets vail you Germans!" for it was in Germany that science first reared her drooping head, and as we watch her restoration under the new influences of arithmetic and algebra, we hail the *second* period of her history, and cease to regret the first.

In the progress of astronomy a branch of science became developed, the important effect of which was to bring the speculative pride of mathematics to minister greatly to physical research. To measure the times and spaces which fall under the investigation of rational astronomy, was an attempt which could only succeed in the schools of Greece, so far as her philosophers had escaped beyond the enchantments of geometry. Thus it is that Hipparchus ranks so high in her annals; for in the course of the daring career that led him to catalogue the stars, he applied to a certain extent the science of TRIGONOMETRY. A definition of this science, derived from the etymology of the word, affords but a feeble sense of its value. Literally, it means the science of the measurement of triangles; but in an extended view, we must call it that which treats of the union betwixt *arithmetical* and *geometrical* properties and powers, in the application of mathematics to physics. It is in fact the basis of physi-

cal astronomy, which is the temple of modern science. The era of trigonometrical computation is, in the history of human knowledge, the great period of transition from the exquisite effeminacy of geometrical constructions, to the omnipotent independence of algebra; and without which period of transition, the higher geometry could not have been attained. To this era Napier stands in the same relation that Newton does to the last and greatest period of mathematical history.

It is not to Hipparchus that Europe owes the introduction of trigonometry. It came, like other strange gifts, from "Araby the blest," before a knowledge of the Greek language had revealed the stores of the schools of Alexandria. "The two men," says Montucla, "to whom the mathematics are most indebted during the fifteenth century are Purbach and Regiomontanus;" and it was in their hands that trigonometry received its first essential improvements beyond both the Grecian and Arabian methods. Purbach, so named from his birth-place in Germany, was born in the year 1423, and, while yet a young man, became professor of astronomy at Vienna, where his fame attracted, as a scholar, the famous John Muller, or Regiomontanus, his junior only by a few years. These two are considered as the first who mark the decided dawn of science. Purbach laboured to relieve, as well as to insure accuracy to, the calculations of astronomers, by framing numerical tables of various kinds, and he introduced a most important change in trigonometrical arithmetic, by modifying the sexagenary system of Ptolemy in the division of the radius of the circle. In Ptolemy's table the radius was computed at 60 degrees, by which the chords and sines were expressed. Purbach supposed the radius to be divided into 600,000 equal parts, and computed the sines of the arcs, for every ten minutes, in such equal parts of the radius by the *decimal* notation. His death, at the early age of 38, left the rich field of conquest he had opened, to his pupil Regiomontanus. This philosopher was even more highly distinguished in every branch of science than his master. That of trigonometry, especially, advanced in his hands to a point which only some extraordinary effort could greatly exceed. He carried the system of Purbach, exclusive of the sexagenary, so far as to have the merit of introducing the first idea of the ordinary practice of decimal fractions, the most valuable addition to arithmetical science since the introduction of Arabic numerals. Thus numbers obtained as it were both their *telescope* and *microscope*, though the instruments were rude, and comparatively feeble until Napier arose. High as Regiomontanus ranks, he

must indeed " vail his bonnet" to the Scotchman ; for, in all the proudest eulogies of him of Konigsberg, our philosopher's superiority is expressly admitted. Montucla declares, that Regiomontanus's system of trigonometry is equal in every respect to that of modern times, if (he adds, however,) we throw out of the comparison the Logarithms, and the trigonometrical theorems of Napier ; and Professor Leslie, in recording the great advance made by the German towards decimal fractions, has these observations:—" To count downwards might seem as easy as to reckon upwards. But the mode of denoting the ranks of decimals was then most cumbrous, the successive numerals, like the indices in algebra, being inclosed in small circles. Bayer, in 1619, proposed to substitute for these complex marks an accent repeated. It was our illustrious countryman Napier, however, that brought the notation of decimals to its ultimate simplicity, having proposed in his Rhabdologia, printed two years earlier, to reject entirely the marks placed over the fractions, and merely to set a point at the end of the units. But his sublime invention of Logarithms about this epoch eclipsed every minor improvement, and *as far transcended the denary notation, as this had surpassed the numeral system of the Greeks.*"* Regiomontanus died in 1475, suddenly cut off, like his master, in the flower of his age, having lived to revolutionize the trigonometrical system of Ptolemy. But a child was already born, from whom the Ptolemaic system of the universe was to receive a signal overthrow.

NICHOLAS COPERNICUS, the author of the True System of the World, was born in Prussia about the year 1473. Regiomontanus, says M. Bailly, " from his deathbed transmitted to the infant Copernicus that torch of astronomy which he had received from Purbach." Certainly no one could have been worthier to receive it. His genius escaping the enchantments that beset its path, and which dazzled and seduced even his successors, penetrated, through the labyrinths of epicycles and crystalline spheres, back to the throne of Pythagoras where it read the truth. This in itself was no trifling intellectual exertion, for the power of an established system, though it present the most clumsy combinations of ignorance or accident, may be fortified and even hallowed by time ; and the incongruities of this ancient system of the world, being entirely concealed from vulgar sense by optical illusion, were also shrouded or softened to the philosophic view by geometrical demonstrations. But the unfettered mind of Coper-

* Leslie's continuation of Playfair's Dissertation. See also *Delambre, Histoire de L'Astronomie Moderne*, T. i. p. 494.

nicus brooded over the doctrine of Pythagoras, that the sun alone was worthy to occupy the centre of the system,—from the stores of Cicero he seized the fact, more precious than his eloquence, that Nicetas of Syracuse had accounted for the rising and setting of the stars, by the supposition of the earth's motion round its own axis; and from the union of these long-rejected speculations, he conceived and formed a planetary system destructive of the Ptolemaic. This invaluable work he reserved for his friends and disciples, and only gave it to the world about the close of his life. In the year 1507, the thirty-fourth of his age, he had already rejected the idols of antiquity, and founded the pillars of physical astronomy; but it was not until the year 1543 that his disciple, Rheticus, undertook to superintend the publication of the new doctrines at Nuremberg. In his preface to the Pope, Copernicus deprecates theological calumnies, and claims the powerful protection of Paul III. But he neither lived to endure or to defeat persecution; stricken in years, he was just able to touch the volume, which his friends had hurried from the press to his deathbed, when he expired in peace, a few years before the birth of Napier.

Copernicus produced a treatise on trigonometry about the commencement of the sixteenth century; and his favourite pupil, George Joachim Rheticus, who became professor of mathematics in the University of Wurtemberg, distinguished himself greatly by his trigonometrical canon, published in 1596, which still further advanced the science. About the same time appeared the *Geometria Triangulorum* of Philip Lansbergius, in four books, enriched with all the increased store of sines, tangents, and secants. Dr Hutton calls this "a brief but very elegant work, the whole being clearly explained, and is perhaps the first set of tables titled with those words." The same author also mentions the trigonometry of Bartholomew Pitiscus, first published at Francfort in the year 1599; and commends it as "a very compleat work, containing, besides the triangular canon, with its construction and use in resolving triangles, the application of trigonometry to problems of Surveying, Altimetry, Architecture, Geography, Dialling, and Astronomy."* This is no doubt, "that clearer font of Hellespont," to which our philosopher's quaint eulogist refers.

Through such hands the science of trigonometry had arrived at great perfection, and the magic circle, clothed with its full complement of lines and angles, seemed now to menace the heavens. But numerical powers had not

* History of Trigonometry attached to Hutton's Tables of Logarithms.

kept pace; so there was an inevitable tendency to shrink from the Herculean task of co-extensive computation, and to relapse into the illusions of sense. It is the remark of Herschel, that, " in all cases which admit of numeration or measurement, it is of the utmost consequence to obtain precise numerical statements, whether in the measure of time, space, or quantity of any kind. Numerical precision is the very soul of science, and its attainment affords the only criterion, or at least the best, of the truth of theories, and the correctness of experiments. Thus, it was entirely to the omission of exact numerical determinations of quantity that the mistakes and confusion of the Stahlian chemistry were attributable,—a confusion which dissipated like a morning mist as soon as precision in this respect came to be regarded as essential." * But while the quantities of chemistry, and the laws of other mundane sciences, or the ordinary estimates of time, space, or velocity, could be readily subjected to the rigor of numbers, the eternal systems to whose vastness trigonometry aspired, presented at each new inspection some Archimedean labour, and it was in vain to attempt precision *where there was not the power.*

TYCHO BRAHE, born four years sooner than Napier, was the last philosopher destined to attempt such achievements without the aid of logarithms; yet he was the first of great renown to whom the coming boon was announced, though he lived not to witness their promulgation, or to comprehend the reality of that announcement. He was born in the year 1546, of a noble family in Denmark, still holding its rank there, and became one of the most distinguished astronomers of any age or country. He is generally named after Copernicus in the history of all that is illustrious in science; and stands unrivalled for ardour in astronomical pursuits, as well as for the magnificent scale upon which he conducted his observations. He appeared at a critical time for the advancement of physical research. The great union betwixt speculative and practical science had been partially effected; but the applicate means were still in the infant state, to which the talents, zeal, and good fortune of Tycho were eminently capable of bringing the necessary impulse. From the rise of this philosopher may be dated the era of astronomical instruments, and the establishment of a complete practical system. Even his besetting sin had a wholesome effect, being precisely the reverse of what had retarded the Grecian schools. He was fonder of observing than of abstract reflection; and so greedy

* Discourse on the Study of Natural Philosophy. This beautiful treatise is not indebted, like Powell's, to the Scotch Dissertations.

of practical excitement, that he occupied his whole genius with the means of gratifying that taste. In the early part of his career he is said to have applied himself diligently to discover the philosopher's stone, and for the most part of his life was as much devoted to chemistry as his loftier pursuits would allow. Two events of his youth seemed to augur a less favourable career in life than what afterwards befel him. Having engaged in a dispute with a friend on the subject of mathematics, the young philosophers brought the question to the arbitrement of their swords, and Tycho lost his nose. This combat took place at seven o'clock of a dark evening in December, the very stars hiding themselves for shame. But the future King of Uranibourg was no ways daunted by his loss, and the manner in which he supplied it is characteristic of the magnificence of all his ideas and habits. He would have disdained that savage borrowing from the forehead, of which modern surgery is so vain; and he rather gloried in an opportunity of obtaining a finer nose than any other man. Accordingly, he framed one of gold, silver, and ivory, exquisitely mingled, and with this he feared not to look Heaven in the face.* Shortly afterwards, he fell in love with a beautiful peasant girl, and married her, to the great displeasure of his noble family, who treated him so rigorously in consequence, that the King of Denmark thought it necessary to interpose his good offices. This gave rise to the illustrious patronage which was fortunate for science. Frederick II. proved himself to be worthier of Tycho for a subject, than James VI. was of Napier. The King of Scotland aspired to be a patron of pedagogues, while his greatest philosopher, the most unobtrusive of human beings, was constrained to remind him, "that here are within your realm (as well as in other countries) godly and good ingynes, versed and exercised in all manner of honest science and godly discipline, who, by your Majesties instigation, might yield forth works and fruits worthy of memory, which otherwise (lacking some mighty Mæcenas to incourage them) may perhaps be buried with eternal silence." At the date of this letter, King James had just returned from visiting Tycho at Uranibourg. There, on the island of Huen, situated at the mouth of the Baltic, Frederick had placed his philosopher on a prouder throne than his own, adding honours and revenues, and every aid

* Histoire des Philosophes Modernes par M. Saverien. Tome V. p. 40. The author adds, "qu'il étoit si bien fait et si bien ajusté, que tout le monde le croyoit naturel. Cela peut être, mais on ne conçoit pas comment l'or et l'argent pouvoient imiter la chair, ces deux métaux étoient apparement caches."

and encouragement that an astronomer could desire. Arabia had been lavish of her stores to renovated science, and now her most romantic tales of magic splendour seemed realized in the north. Upon the 8th of August 1576, the first stone of the far-famed castle of Uranibourg was laid in Tycho's principality. The island, about eight miles in circumference, rises by a gentle elevation so as to command the sea and the horizon on all sides, and the edifice with which it was honoured was as royal as the gift. It was of a quadrangular form, the dimensions being sixty feet every way, and flanked with lofty towers thirty-two feet in diameter, the observatories of this palace of science. Tycho's whole establishment was in keeping with the magnificence of his dwelling, where his gold and ivory nose seemed no longer out of place. Like other potentates, he kept an idiot, but gifted with second sight, who, as we have elsewhere noted, sat at his feet at meals. Tycho is also said to have fitted up his palace with certain mysterious tubes, and other telegraphic contrivances, which enabled him to communicate with his domestics as if by magic, and to obtain secret knowledge of his many visitors long before their arrival.

But could the King of Denmark have given his philosopher the Logarithms, he would have done more for his fame. If, to Arabic splendour, he could have added the power that still lay hid in Arabic numbers, a false system of the world might not have been re-established at Huen. With such numerical aid, Tycho's observations, escaping the illusions of sense, would have become imbued with what Herschel so justly calls, "*the very soul of science*;" and thus, gifted with powers of calculation beyond even his pupil Kepler, it might not have been left for the latter to become "the legislator of the heavens." Tycho catalogued the stars with an accuracy, and to an extent which threw the labours of Hipparchus and Ptolemy for ever into shade. His instruments, "were of far greater size, more skilfully contrived, and more nicely divided, than any that had yet been directed to the heavens. By means of them he could measure angles to ten seconds, which may be accounted sixty times the accuracy of the instrument of Ptolemy, or of any that had belonged to the school of Alexandria." But he was, comparatively speaking, feeble in *calculation*, so he wasted his genius in framing systems out of his own imagination, and fortifying them with his ingenuity. Rejecting that of Copernicus, he took vast credit to himself for superseding the Ptolemaic system with his own, which was, that the sun, attended with the whole cortege

of revolving stars, performed the grand revolution round the central and stationary earth. "If Tycho had lived before Copernicus, his system would have been a step in the advancement of science; coming after him it was a step backward." His illustrious pupil Kepler, however, has left a record of what calculation could do to redeem the mind from such erratic flights. He undertook the Herculean task of unravelling the irregular orbit of the planet Mars, and succeeded in determining the relative position of the sun, both in respect of Mars and of the earth, and thus laid the foundation for the true solar system. But in doing so he had to grapple with calculations to which few men in Europe but himself and Napier were equal. "The industry and patience of Kepler in this investigation were not less remarkable than his ingenuity and invention. Logarithms were not yet known, so that arithmetical computation, when pushed to great accuracy, was carried on at a vast expense of time and labour. In the calculation of every opposition of Mars, the work filled ten folio pages, and Kepler repeated each calculation ten times, so that the whole work for each opposition extended to one hundred such pages; seven oppositions thus calculated produced a large folio volume." *

It is a remarkable fact, and not generally known, that Tycho Brahe was informed of the boon to be conferred upon science, in a very direct communication from Napier himself, *twenty years* before our philosopher's other avocations, added to the labour of the computations, and his own diffidence, suffered him to give the logarithms to the world. We have already noticed that Sir Archibald Napier's colleague in the office of justice-depute was Sir Thomas Craig of Riccarton. Betwixt the Feudist's third son, John Craig, and John Napier, a friendship grew up, of which the source is not to be doubted. Young Craig was devoted to mathematical studies, and, although not gifted with those lofty capacities which have placed his friend among the lights of the world, he was an excellent mathematician. There is, indeed, one record which of itself is sufficient to hallow the memory of Dr Craig, though it is rarely met with in his own country, and still seldomer perused. I allude to a small volume of Latin epistles printed at Brunswick in the year 1737, and dedicated by their collector, *Rud. Aug. Noltenius*, to the Duke of Brunswick. The three first letters in the collection are from Craig to Tycho Brahe, and prove that he was upon the most friendly and confidential footing with the Danish astronomer. He addresses Tycho as his "honored friend," and signs

* Playfair's Dissertation.

himself "your most affectionate John Craig, doctor of philosophy and medicine." The first letter thus commences: "About the beginning of last winter that magnificent man Sir William Stuart delivered to me your letter and the book you sent." The date is not given, but I have seen a mathematical work of Tycho's in the library of the Edinburgh University, which bears upon the first blank leaf a manuscript sentence in Latin to the following effect: "To Doctor John Craig of Edinburgh in Scotland, a most illustrious man, and highly gifted with varied and excellent learning, Professor of Medicine, and exceedingly skilled in the mathematics, Tycho Brahe hath sent this gift, and with his own hand hath written this at Uraniburg, 2 November 1588." It appears from contemporary chronicles, that, in the month of August 1588, Sir William Stuart, commanding the King's guard, the same who may have been the bearer of Napier's catoptric proposals to the secretary of Essex, was sent to Denmark to arrange the preliminaries of the King's marriage, and that he returned to Edinburgh upon the 15th of November 1588. There can be no doubt that the book in the College Library is that referred to in Craig's epistle to Tycho, which must have been written, therefore, in the beginning of the year 1589. Neither can it be doubted that this was Sir Thomas Craig's third son, Dr John Craig, physician to King James. Napier mentions him in a letter to his own son, quoted in a previous chapter, where he says, "Ye sal mind me to Doctor Craig;" which letter is dated 1608, when Napier's son and the King's physician were both with his Majesty in England.

That fine old gossip, Anthony a Wood, picked up a story of Napier, Dr Craig, and the Logarithms, which he thus recorded in the *Athenæ Oxonienses*.

"It must be now known, that one Dr Craig, a Scotchman, perhaps the same mentioned in the FASTI, under the year 1605, among the incorporation, coming out of Denmark into his own country, called upon Joh. Neper, Baron of Merchestoun, near Edinburgh, and told him, among other discourses, of a new invention in Denmark (by Longomontanus, as 'tis said,) to save the tedious multiplication and division in astronomical calculations. Neper being solicitous to know farther of him concerning this matter, he could give no other account of it than that it was by proportional numbers. Which hint Neper taking, he desired him at his return to call upon him again. Craig, after some weeks had passed, did so, and Neper then showed him a rude draught of what he called *Canon mirabilis Logarithmorum*. Which draught, with some alterations, he printing in 1614, it came forthwith into the hands of our author

Briggs, and into those of Will. Oughtred, from whom the relation of this matter came." *

It is singular that authors who ought to know something of the theory of logarithms have been led by this anecdote to refer their conception in Napier's mind to such a casual accident, and the production of the *canon mirificus* to the cogitation of a few weeks. Even Dr Charles Hutton, whose mathematical works are so valuable, adopts the opinion, that our philosopher was thus "urged into action," and quotes the anecdote as if he believed it literally. Another philosophical writer alludes to the same story in support of his proposition, that Napier's mind was very ready to *take a hint* in such matters. † A hint! why the whole world had been in possession of one since the days of Archimedes. If a hint could have urged any human mind thus rapidly upon the theory of the Logarithms, there was a hint which arose in the school of Alexandria, which was submerged in the middle ages, and rose again with the letters of Greece; which Tycho had—which Stifellius, Byrgius, Longomontanus, and above all

* The passage referred to in the Fasti is as follows: "—— Craig, a Scot, doct. of phys. of the university of Basil. This is all that appears of him in the public register. So that whether he be the same with another of the Dr —— Craigs, the King's physicians, one of whom died in Apr. 1620, I know not; or whether he be Joh. Cragg Dr of Phys., author of a MS. entit. *Capnuraniæ seu Comet. in Æthera Sublimationis Refutatio*, written in qu. to Tycho Brahe, a Dane, I am altogether ignorant." But upon comparing the letters quoted in the text with other records and dates, it is manifest, that John Craig, King's physician, and the author of the MS. to Tycho, are one and the same person. There was no other Craig in that capacity, that I am aware of; but there was the well-known Dr John Craig, "Minister of God's word to the King's Majesty," who was the relative and preceptor of Sir Thomas Craig, and died at the age of 88, in the year 1600. James Baillie, in his Life of Sir Thomas Craig, prefixed to his works, says that the Feudist's *second* son was Sir James Craig of Castle Craig and Craigston in Ireland, and that he left his fortune to his immediate younger brother, "Joanni Cragio, qui Jacobo VI. medicus ordinarius, Carolo I. archiater fuit." Mr Tytler, in his Life of Craig, p. 246, also says that John Craig, "became successively physician to James VI. and Charles I." But Dr Craig died before the reign of Charles I.; for in the Fœdera, I find the royal gift of James VI. "dilecto nobis Johanni Craigio in medicinis doctori officium et locum ordinarii et primarii medici nostri," with a hundred pounds of English money per annum, and various perquisites, dated at Westminster, 20th June 1603; and in the same record appears the like gift, dated 9th July 1620, "Jacobo Chambers in medicinis doctori officium et locum ordinarii medici nostri quod Johannes Craige *defunctus* nuper tenuit." The evidence seems complete, that the third son of Sir Thomas Craig,—Napier's friend,—Tycho's correspondent,—and King James' Physician were all one and the same John Craig, who died in 1620.

† Tilloch's Philosophical Magazine, Vol. xviii. p. 53. See also Hutton's Mathematical Dictionary, *Napier*; and article *Napier* in Brewster's Encyclopædia.

which *Kepler* had—and all made no more of it than Archimedes had done. If our philosopher really broke the spell in an afternoon's reflection upon a forenoon's conversation with Dr Craig, he is a greater man than we took him for; but we shall find that Napier kept beside him, unknown to the world, the construction of his canon, under the name of "*Tabula Artificialis*," for years before he *invented the word Logarithms*; therefore Wood is clearly wrong when he says that Napier called the rude draught (assumed to have been constructed for the occasion) "*Canon Mirabilis Logarithmorum*." The story, however, is not without foundation. Kepler, in a letter to his friend Cugerus, chiefly regarding the economy of the heavenly bodies, after revelling in all the unapproachable sublimities of his calculations, and naming and commenting upon the most illustrious benefactors of trigonometry, exclaims, "But nothing, in my mind, surpasses the method of Napier, although a certain Scotchman, even in the year 1594, held out some promise of that wonderful canon in a letter to Tycho."* That this correspondent was Dr John Craig cannot be doubted when the fact is coupled with what we have noticed above. Craig had long intended to pay Tycho a visit, as appears from his own account in the letter he wrote to that philosopher in 1589. He there states, that five years before, he made an attempt to reach Uranibourg, but had been baffled by storms and the inhospitable rocks of Norway, and that ever since, being more and more attracted by the accounts brought by ambassadors and others, of Tycho's fame, and the magnificent scale of his observatory, he had been longing to visit him. It is not at all unlikely, therefore, that James VI., who in the year 1590 spent some days at Uranibourg before returning to Scotland, had been encouraged in the idea of paying his

* *Nihil autem supra Neperianam rationem esse puto: etsi quidem, Scotus quidam literis at Tychonem* A. CIↃIↃXCIV *scriptis jam spem fecit Canonis illius Mirifici.* PETRUS CUGERUS, to whom the letter is addressed, a mathematician of Dantzick, and the master of the celebrated Helvelius, was a favourite correspondent of Kepler's. The volume in which the above occurs is *Kepleri Epistolæ*, a splendid folio, published under the auspices of the Emperor Charles VI. by *Michael Gottlieb Hanschius.* I was anxious to see this volume, but could find it nowhere in Scotland, nor could I procure a copy from London. Dr Irving, however, obtained one from Germany, which is now in the Advocates' Library. Napier is particularly mentioned by the learned editor in his prefatory notice of great men,—"*Non hic reticenda est* Jo. NEPPERI, *Baronis Merchistonii Scoti, inventio Canonis Mirifici Logarithmorum*,"—he mistakes, however, the import of Kepler's expressions, the gloss on the margin being *Canon Mirificus an Nepperi?* But Kepler meant to imply no such doubt, as will afterwards appear from his own letter to Napier, which is not in this collection.

respects to the philosopher from the suggestion of Dr Craig, who was so long about his person in a medical capacity, and ultimately at the head of his medical board. Craig, of course, seized the propitious opportunity of the royal progress, to visit his friend, and we may well imagine, that among the first to whom on his return to Scotland he narrated all that he had seen and heard at Huen, was John Napier. Something must have passed betwixt them as to the trigonometrical difficulties experienced by Tycho and his assistant Longomontanus, in the vast field of their researches; and Kepler was too well acquainted with the prince of Uranibourg, and his correspondence, not to be worthy of the fullest credit when he says, that Tycho's friend in Scotland wrote him a promise of the Logarithms so early as 1594. We have looked in vain for that letter, which Kepler probably had only heard of, as he did not join Tycho until after the expulsion of the latter from his island in 1597.* Enough, however, is here afforded completely to refute the idea which some have adopted from the anecdote in Wood. If, on the return of Craig from Denmark in 1590, Napier had actually framed his canon for the special purpose supposed, the boon would not have remained unheard of for more than twenty years; and if the hint from Longomontanus was of a nature to lead thus suddenly to the discovery, surely the Danish philosopher might himself have made something of the matter when, in addition to his own idea, he received through Craig a new hint in the account of Napier's success. The fact is, that *no hints* could so quickly generate the logarithms, the discovery of which was the fruit of most original, profound, and laborious abstraction. That our philosopher delay-

* There is an anachronism committed, *supra*, p. 147. Kepler did not join Tycho until the expulsion of the latter from Uranibourg. But Longomontanus was with him there for eight years, and Dr Brewster (Life of Newton, p. 122,) is mistaken in supposing that he only joined him as a pupil at the time Kepler did. Of all Tycho's pupils and assistants at Uranibourg, the most distinguished was Longomontanus, the son of a labourer, and so called from his birth place in Germany. It was the affectation of the times to construct sonorous names from the birth-place; such as, *Rheticus*, *Dithmarthus*, *Regiomontanus*. Kepler was sometimes called, for the same reason, *Leomontanus*. There is no notice in the works of Longomontanus that he had acquired the slightest foreknowledge of the Logarithms; and, according to *Vossius* and *Montucla*, he survived Napier for nearly thirty years, nor ever hinted such a claim. The learned Thomas Smith notices the anecdote of Wood to reject it, and adds, in reference to Longomontanus, "an verò quicquam simile aut quovis modo analogum, hac ex parte præstiterit celeberrimus ille Tychonis discipulus, alitèr famæ in se ex scriptis editis et inventis derivandæ cupidissimus, nullibi ab illo memoratum reperio. Inventum hoc prorsus mirabile cælesti ingenio *Neperi* unicè debetur."—*Vitæ Eruditissimorum, &c.*

ed the publication long after he had achieved the conquest, may easily be accounted for both by the nature of the tables he had to construct, and of his own diffident and retiring disposition.

Tycho Brahe did not live to obtain the benefit of a discovery which thus seems to have been first reported to himself on his throne of science. Soon after the date of that communication, his reverse of fortune occurred which so cruelly interrupted his studies. The death of his kind patron Frederick II. left him a prey to faction, and the grand master of the king's household was his enemy. The pretext of economy, a never-failing recourse of all rising factions, was listened to as a reason for breaking up the establishment at Huen. And Tycho was driven from Uranibourg, where for five and twenty years he had made acquaintance with the stars, and spread the light of science far and wide. He was deprived of the throne before which kings had bowed, and in his declining years was turned adrift with his family to seek an asylum elsewhere. The latest biographer of Newton has (most unjustly we think) bitterly reproached England for her treatment of her own philosopher. "Such disregard," are his words, "of the highest genius, dignified by the highest virtue, could have taken place *only in England*, and we should have ascribed it to the turbulence of the age in which he lived, had we not seen in the history of another century that the successive governments which preside over the destinies of our country, have never been able either to feel or to recognize the true nobility of genius."* But England, who *did not* thus disgrace herself, would, in the worst fit of economy that ever afflicted her, have shrunk from treating Newton as Denmark treated Tycho. To the honour of Germany, Rodolph II. received the wanderer, and his faithful Longomontanus, at Prague, and re-established him in a faint reflection of his former state. It was under this emperor's patronage that he received as a coadjutor the immortal Kepler, which might have consoled him for the loss of Uranibourg. His health, however, was broken, and he died at the age of fifty-five, in the year 1601, when speculative and prac-

* This severe sentence has a ludicrous effect when contrasted with the index of the very work in which it occurs. "Mr Newton, warden of the Mint, in 1695—appointed master of the Mint in 1699—elected associate of the Academy of Sciences in 1699—Member for Cambridge in 1701—President of the Royal Society in 1703—Queen Anne confers upon him the honour of knighthood in 1705—His death 1727—His body lies in state—He is buried in Westminster Abbey—A medal struck in honour of him—Roubilliac's full length statue of him erected in Cambridge." —*Dr Brewster's Life of Newton.*

tical science were both on the very eve of obtaining the two greatest impulses they ever received, Logarithms and the Telescope.

In reference to the state of science, no less than to the scientific fame of this country, Napier's discovery was admirably timed. Kepler was in the act of examining the orbits of the planets, to the destruction of Tycho's system, but at the expense of calculations, which, had the Scotch philosopher not come to his aid, would have killed him. Galileo had just turned the telescope to the stars, and disclosed a scene which added so vastly to the field of inquiry that trigonometry was paralysed, and could grasp the heavens no longer. But before proceeding with the history of the Canon Mirificus, we must pause to do homage to him, "the starry Galileo," for he was suffering the persecution of the Romish Church at the very time when Napier's treatise against Antichrist was creating a sensation on the continent; and the treatment he met with affords another contradiction to Brewster's condemnation of England.

He was born at Pisa in the year 1564, fourteen years later than Napier. His father was a Florentine nobleman, highly distinguished for his taste and accomplishments, and rather averse to the philosophical propensities which displayed themselves in his son at an early age. But Galileo overcame every obstacle, and devoted his whole mind to physical research. His open hostility to the schoolmen, necessarily placed him in imminent danger at an early period of his career, and he was soon forced to take refuge in Padua from the bigotted faction of his country. There, in 1592, he obtained the professorship of mathematics, which he graced for nearly twenty years with a reputation constantly increasing, until Cosmo II., the son and successor of Ferdinand his original patron, courted his return to Pisa, and placed him at the head of the science of his country with every mark of honour and means of independence. Galileo had then ample opportunity to apply the whole powers of his penetrating observation against the ancient systems, which he fearlessly derided. While a storm was gathering around this determined enemy of Aristotle and Ptolemy, Providence placed in his hand that discovery which became the acme at once of his triumph and his persecution. Some superficial observer had detected the fact, that a certain combination of glasses magnified objects seen through them. Galileo, who in that sickly age of philosophy already reasoned like a Baconian, and was the most penetrating of experimentalists, brought the popular fact under the question of his severest scrutiny, and extorted from nature her secret of the telescope. It would prolong his biography beyond the purpose of this sktech,

to follow minutely the triumph. His own account, so graphically given in the *Sidereus Nuncius*, of his gradual approach, through a long chain of optical experiment, from the fact he scrutinized to the complete instrument, the astounding success of its first application, and his details, *con amore*, of those ethereal visions of immortal light, gradually disclosing their unheard of economy, complete the most splendid picture in the history of applicate science, and compose a narrative more fascinating than an eastern tale, and more exciting than the fictions of romance. In our long enlightened age, we can scarcely appreciate the triumph of Galileo. He obtained the homage of kings, and became domesticated in palaces. The most important result, and to him infinitely above the favour of princes, was the visible demonstration which the telescope afforded of the truth of the Copernican system. Not only by unfolding the immensity of creation, and the lavish economy of the heavenly bodies, were the pretensions of our own planet to repose in the centre of such a system rendered palpably ridiculous, but facts were disclosed of a nature to force conviction upon the most unwilling. It had been objected to Copernicus, that, if his theory of the heavenly bodies were correct, some of the planets, especially Venus, while describing an orbit round the sun, and betwixt that luminary and the earth, would present phases like the moon. Copernicus met the objection in the boldest manner. He saw the necessity of the deduction, and maintained, that were it not for the minute sparkle of the distant planet, her phases would be visible. Galileo, by the most persevering observations, found the fact to be precisely as predicted. He might have despaired had he only discovered the satellites of Jupiter, and we may imagine the feverish anxiety with which he sought to redeem this special pledge of Tycho's predecessor, and almost dreaded the result of each new developement. The prediction of Copernicus was so bold, the field of research so vast, that to doubt and tremble for the result might be forgiven in the most ardent and indomitable of his disciples.

> At Venus ætherios inter Dea candida nimbos
> Dona ferens aderat.
> Ille Deæ donis et tanto lætus honore
> Expleri nequit, atque oculos per singula volvit,
> Miraturque !

From night to night, a season to him of more than diurnal excitement or meridian splendour, he followed with sleepless assiduity the bright steps of the beautiful goddess, detected, with trembling devotion, the coy planet in all her

phases, and he remembered his master. " Oh Nicholas Copernicus !" he exclaimed, " how would'st thou have exulted at this evidence of thy truth !"

The life of Galileo had its phases like the planets. The terrors of the Inquisition were then more than a match for philosophers and princes, and it was not likely that discoveries which so greatly increased the rising tide of universal reformation, would escape the keenest persecution of the church. The system of Copernicus was, comparatively, little dreaded by the Jesuits until they found it so powerfully pressed upon the conviction even of the vulgar, by the most fascinating application to their senses. It was not at once, however, that they could attempt to crush a philosopher, whose lofty genius and unprecedented success had drawn around him a brilliant and powerful circle, which he daily enlightened. But the extreme popularity of his dialogues on the rival systems, and the ridicule with which they overwhelmed the adversaries of Copernicus, roused the Inquisition. Not all the power of his friends could shield the aged philosopher; and it is sad to think, that such a name as Galileo's should be connected with the darkest secrets of the Inquisition. Some phrases in the sentence pronounced against him create a suspicion, that the holy tribunal had privately inflicted torture upon the noble Florentine for the purpose of reducing his spirit to obedience. The details of this disgusting judicial process against one of the greatest benefactors of science are too painful to be dwelt upon. The result was the celebrated abjuration, which the church has put on record to its own eternal disgrace as a judicial establishment. The composition of that oath dictated by the Inquisition,—its blasphemous energy of style,—the solemn ignorance of its details,—the very first words, " I, Galileo Galilei, aged seventy years, being brought personally to judgment, and kneeling before you most eminent, and most reverend Lords Cardinals, general inquisitors of the universal Christian republic against heretical depravity," &c.—the seven cardinals signing their own immortal infamy,—compose the severest satire ever penned against the Church of Rome. Why have all the distinguished philosophers of our own times not done justice to the memory of the illustrious Galileo, who in his will so pathetically and confidently bequeathed his fame to after ages? Delambre has hastily censured him for want of sincerity; and Brewster, a disciple of light, has arraigned him at the bar of public opinion with more solemn and elaborate injustice. " On the 22d June 1633," says Newton's biographer, " Galileo signed an abjuration humiliating to himself, and degrading to philosophy. At the age of

seventy, on his bended knees, and with his right hand resting on the Holy Evangelists, did this patriarch of science avow his present and past belief in all the dogmas of the Romish Church, abandon as false and heretical the doctrine of the earth's motion, and of the sun's immobility, and pledge himself to denounce to the Inquisition any other person who was even suspected of heresy. He abjured, cursed, and detested those eternal and immutable truths, which the Almighty had permitted him to be the first to establish. What a mortifying picture of *moral depravity and intellectual weakness!* If the unholy zeal of the Assembly of Cardinals has been branded with *infamy, what must we think of the venerable sage,* whose gray hairs were entwined with the chaplet of immortality, quailing under the fear of man, and sacrificing the convictions of his conscience, and the deductions of his reason, at the altar of a base superstition? Had Galileo but added the courage of the martyr to the wisdom of the sage,—had he carried the glance of his indignant eye round the circle of his judges,*—had he lifted his hands to Heaven, and called the living God to witness the truth and immutability of his opinions, the bigotry of his enemies would have been disarmed, and science would have enjoyed a memorable triumph."

It is impossible to admit that this is either true to the character, or just to the conduct, of Galileo. The most gentle and least pugnacious are fond to picture lofty conceptions of indomitable bearing, which yet might desert the stoutest in the hour of need; and from the bosom of security it is not difficult to pronounce an eloquent anathema against extorted apostacy, and to flatter ourselves that we would have remained unmoved amid terrors, and mute under torture. But it should not be forgotten that the spirit of Galileo, though shattered by the weight of seventy years, and many a physical infirmity, still required the earnest and anxious persuasions of judicious friends to subdue it. Alas! for such weapons against the most holy Inquisition, as the trembling invocation of aged hands, and the indignant glance of an old man's eye, whose vision had been already sacrificed at the fountains

* By this time Galileo was nearly blind from the use of his telescope, and not long afterwards became *totally blind.* Newton's biographer, (p. 139,) ingrafts a sentiment of his own upon the eloquence of M. Bailly; " C'est un singulier spectacle que celui d'un vieillard couvert de cheveux blanchis par l'étude, par ses veilles, par ses bienfaits envers les hommes, à genoux devant le livre le plus respectable, abjurant la vérité aux yeux de l'Italie qu'il avoit éclairée, malgré le temoinage de sa propre conscience, et contre la nature entière qui manifeste cette vérité." But Bailly condemns the judges, not the victim.—*Astronomie Moderne,* Tome ii. p. 130.

of light. There is an obvious fallacy, too, which pervades the *moral* sentiment of the author quoted, when he bewails the absence of the "courage of a martyr from the conduct of the sage." To expire calmly under torture, as an evidence of believing, has substantial meaning in the cause where *faith is life*, though even in that cause it is not for mortal man to condemn the frailty of the flesh shrinking under terror or torture. But when the idea is extended beyond the case of adherence to the Christian creed, the necessity or beauty of martyrdom assumes a very different, perhaps an equivocal aspect. Unprotected by mortal power, unsustained by those immortal visions which the martyrs of the *church* found mightier than the help of man, was that illustrious philosopher, bending under a load of infirmities, brought before a tribunal whose actual terrors romance cannot exaggerate. Had he called God to witness the truth of *demonstration*, and sacrificed his life "at the altar of a base superstition," where would have been the triumph to science? the melancholy scene would not have added an atom to the evidence of physical truths—not a convert to the system of Copernicus. If, in the particular instance, Galileo did not display the courage of the martyr, it cannot be denied that he eminently possessed the daring of a man. In character and temperament he resembled his friend Kepler, and it was the persevering and satirical independence of his tone, which ultimately brought him under the ban of the Inquisition. There cannot be a stronger proof of his spirit than the exclamation with which, old, and feeble, and subdued as he was, he accompanied his extorted oath. To him the whole pageantry of the abjuration appeared a ludicrous satire on his judges. Thoroughly imbued with a feeling of the necessity of demonstrated truth, to him it was the same to be compelled to call God to witness against any self-evident proposition, as that the system of Copernicus was false; and to a mind, accustomed like his to mount so easily from proposition to proposition in the ascending scale of mathematical certainty, it was not more absurd to forswear that two and two make four, than those eternal truths which the very evidence of his senses had confirmed. Regarding the ignorant energy of the abjuration dictated to him, as supremely ridiculous, the venerable philosopher, when rising from the kneeling attitude, struck the earth with his foot, and murmured to his friends,—"*It moves, nevertheless.*"

Bailly, in his eloquent history of astronomy, observes, that, with the

aid of the telescope, man had penetrated far into space, and yet that nature, in opening so many paths to truth, would have done nothing for mankind, had she not also afforded the means of economising time; that physical researches increasing in multitude, depth, and nicety, required the aid of numerical calculation to an infinite extent, the labour of which left philosophers with broken spirits and a prey to disgusts; that the same calculations which now occupy a month, were then the labour of three years, and that *Kepler alone* was unsubdued by the tyranny of logistic. But, he adds, "Le baron de Neper, Ecossois, montra des routes plus faciles, et il a rendu son nom immortel, comme celui des bienfaiteurs du monde." While Denmark had Tycho, France Vieta, Germany Kepler, and Italy Galileo, Britain was absolutely rayless by comparison; for Roger Bacon belonged to an obsolete era, Francis Bacon was yet a statesman, and the works of Harriot were not published until many years after the death of Napier. The moment, however, it came to be understood, that, by the exertions of a single individual, NUMBERS were revolutionized,—and in their loftiest department the science of trigonometry,—all eyes were turned to Scotland. Nor is this a partial and local sentiment. From Bailly we have drawn a description of the painful struggles of science while her best wing was fettered, and from Montucla we shall cull a picture of her daring flight the moment that wing was free.

"Among the ages which have successively contributed to the advancement of the sciences, that which is now fleeting away (the 18th century) holds undoubtedly the highest rank, and probably no succeeding age will deprive it of that elevation. Far be it from us to fix a limit to the human mind. Who knows the last boundary of knowledge, or where she must stay her step! Day after day uttereth knowledge, and to disregard the progress of discovery would be to withhold unjustly the tribute that is due to our illustrious contemporaries. Still, when we regard the wonderful flight which the sciences, and especially the mathematics, took in the *seventeenth* century, we must admit, that, whatever perfection they may receive from succeeding ages, a vast portion even of *their* glory will ever reflect back upon the age which so propitiously commenced the career. How brilliant is the spectacle which that era presents! How fascinating and admirable to the philosophic eye! If we turn to the pure mathematics, we find in the first years of that century LOGARITHMS, that invention so ingenious, and whose utility surpasses its ingenuity. We perceive the algebraic analysis, or the resolution of equations, greatly advanced

by the discoveries of Harriot, Descartes, Newton, Halley. A new geometry, generated in the hands of Cavalleri, and cultivated by others, aspires to researches far beyond the penetration of antiquity. Descartes in the meanwhile explores another path, and, applying the analysis to his geometry, gives the theory of curves an extension and play hitherto unknown, and invents a variety of methods of solving with perfect certainty the most difficult problems in that branch of science. Fermat, the rival and contemporary of Descartes, pursues the same career, and promulgates inventions in which the germ of the new calculus is greatly developed. Wallis, Barrow, Gregory, enrich geometry with a multitude of new methods and discoveries. Newton at length gives birth to that sublime geometry, compared with which the labours that paved the way were as trifles, and has furnished the only key to those difficult investigations which occupy the geometers and naturalists of the present day. If we carry our view to the mixed mathematics, we will be no less delighted with the prospect of their acceleration. Mechanics present to us the laws of motion and its communication, the laws of the acceleration of heavy bodies, of the path of projectiles, of the motion and reciprocal action of fluids. We see them enriched by several profound theories,—such as the centre of oscillation, the resistance of fluids, the doctrine of central forces, &c. At the same time the progress of optics is proceeding with equal brilliancy, the laws of vision and refraction unfolded, and a new science rises from that foundation. The telescope and microscope afford aids unknown to antiquity, — the rainbow is submitted to reason, — light is analyzed, and the various refrangibility of colours detected, — the reflecting telescope is conceived and constructed with success,—Astronomy, in fine, presents us at once with the discovery of the actual forms of the planetary orbits, and of the laws which preside over the celestial motions. Soon after the invention of the telescope, we see astronomers as it were soaring into space,—descrying the spots on the sun,—the motion of that luminary round its axis, —the phases of Venus and Mercury,—the little planets which attend like moons the steps of Jupiter, and of Saturn with his marvellous ring,—phenomena which shed a meridian light upon the true system of the universe. Upon these observations geography is entirely remodelled,—the earth is measured with an accuracy far surpassing the measurement of the ancients, and her true form is ascertained,—the truth of Kepler's observations is demonstrated by means of a profound application of geometry and mechanics to the

motion of the heavenly bodies,—the comet is controlled into a planet, and the career of that rare apparition submitted to calculation. The moon, so long rebellious to astronomy, is captive at length, and her eccentricities accounted for. And at last, from the hands of the immortal Newton, we receive the system of physical astronomy, the master-piece of geometry and mechanics, accumulating daily new confirmation from the combined labours of geometricians and observers." *

With how few of the conquests here enumerated is that of Napier not identified. To be named first among the great landmarks of an era of calculation, is certainly due to him, because the mechanical discovery of the telescope, though applied a few years before the *promulgation* of Logarithms, has no pretensions to such intellectual claims. The century which commenced with the *Canon Mirificus Logarithmorum*, and was followed by the *Novum Organum Scientiarum*, deserved to be closed by the *Principia Mathematica*; and thus it is that Napier, and Bacon, and Newton, created the transcendant era of science, and, to use a congenial phrase, brought up so gloriously the lee-way of old England.

We now present the reader with a fac-simile of a title-page fraught with glad tidings; and we do so, not so much on account of the beauty of the design, as because no page of profane history can be more interesting, though the volume is so rare that the most illustrious commentators upon Logarithms have never seen it. † But all the power of such minds as Montucla's and Delambre's has been called into action in order to analyze the structure, to test the intellectual value, and to expound the theory of this work, while other authors, of no mean repute in the school of Newton, have treated of it in a manner which shows how deeply rooted the theory is, and how it comes into operation with all the mysterious powers of the higher calculus. In order to see that it would be vain and presumptuous for any one, not far above mediocrity in mathematics, to attempt a scientific analysis of the invention, it is only necessary to glance at such works, and also at the six enormous volumes entitled "Scriptores Logarithmici," which form the scientific collections of Baron Maseres. Were it

* "Tableau Général des dècouvertes Mathématiques dues au dix-septième siècle." *Histoire des Mathématiques*, Tom. ii. p. 2.

† "La première edition de cet ouvrage important est de 1614; je n'ai que celle de Lyon, 1620." DELAMBRE, *Astronomie Moderne*, Tom. i. Livre v. *Neper, Kepler, et Briggs.*

MIRIFICI

Logarithmorum *Canonis descriptio*,

Ejusque usus, in utraque *Trigonometria*; *ut etiam in* omni Logistica Mathematica, *Amplissimi, Facillimi, & expeditissimi explicatio.*

Authore ac Inventore,
IOANNE NEPERO,
Barone Merchistonii,
&c. Scoto.

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desirable to add to the historical memoirs of Napier's Life and Times such an account of the Canon Mirificus as philosophers might relish, it would be quite unnecessary for me to adopt the plan of Lord Buchan, and take into partnership some man of learning equal to the task. DELAMBRE has written that chapter of our philosopher's life. But to translate in these pages the labours of Delambre, whose elegance and depth have left nothing to desire, and would suffer from abridgement, would be of no use to readers who can relish his writings, and unintelligible to all the rest. Science has a language that is sealed to most people, though indispensable, from the very relief it affords, to philosophers. Delambre himself might shrink at the idea of extracting the secret of Logarithms from numbers, in the chaotic state in which Napier found them; and of constructing the tables, and demonstrating them to the world with the imperfect mathematical resources and language of his day. It was like separating the light from darkness, and Newton was not compelled *envisager* the subjects from which he drew his immortality, under the difficulties that beset the path of Napier. A complete exposition of Logarithms, therefore, is not to be attempted except in the modern language of science; and we cannot pay our philosopher a higher compliment than to say, that, until that language came to be developed, with all the powers and properties of numbers which it alone can fully disclose, no complete exposition of his work could be obtained. Delambre, therefore, and all who are capable of the investigation, have viewed the invention under the penetrating lights of the New Geometry, and draw this inference as to the author's mind, "Tous ces moyens étaient connus de Néper, quoiqu'il n'eût pas ces expressions algébriques; ce calcul est la traduction de ses raisonnemens; c'en est le fond, si ce n'est pas la forme tout à fait; il ne négligeait que des quantites reconnues insensibles; la construction de ses tables préparatoires est donc démontrée."

But the general reader, however anxious to form a just estimate of Napier's achievement, would scarcely thank us for an analysis which requires to be expounded as follows:—"Néper n'emploie pas ces expressions, que n'étaient pas connues; mais soit R le rayon; les limites seront $\frac{R^2}{\sin A} - R$ et $R - \sin A$; la moyenne arithmétique $\frac{R^2 - R \sin A}{2 \sin A} + \frac{R - \sin A}{2} = \frac{R^2 - R \sin A + R \sin A - \sin^2 A}{2 \sin A} = \frac{R^2 - \sin^2 A}{2 \sin A} = \frac{(R + \sin A)(R - \sin A)}{2 \sin A}$.

" Voici encore un autre theórème dont Néper a fait usage, et qu'il présente un peu différemment.

Log sin A — log sin A′ est entre $R\left(\frac{\sin A - \sin A'}{\sin A}\right)$ et $R\left(\frac{\sin A - \sin A'}{\sin A'}\right)$, ou entre $\left(\frac{R}{\sin A}\right)(\sin A - \sin A')$ et $\left(\frac{R}{\sin A'}\right)(\sin A - \sin A')$; la moyenne arithmétique serait $\left(\frac{R}{2 \sin A}\right)(\sin A - \sin A') + \left(\frac{R}{2 \sin A'}\right)(\sin A - \sin A')$, $\frac{1}{2}$ (coséc A + coséc A′) (sin A — sin A′).

La moyenne géométrique $\frac{R(\sin A - \sin A')}{\sqrt{\sin A \sin A'}} = \frac{R(\sin A - \sin A')}{\sqrt{\sin^2 (A - \frac{1}{2} A)}} =$ $\frac{R(\sin A - \sin A')}{\sin (A - \frac{1}{2} d A)}$ à peu près, ou $d \log n = \frac{d n}{n - \frac{1}{2} d n}$.

" Par ces moyens on aura les deux limites d'un logarithme et sa valeur à peu pres," &c. " c'est ainsi que Néper a trouvé," &c. *

Or, to take one other example from the same author,

$$[(\text{coséc A} - 1)(1 - \sin A)]^{\frac{1}{2}} = [(x + x^2 + x^3 + x^4 + \text{etc.})\ (x)]^{\frac{1}{2}}$$

$$= (x^2 + x^3 + x^4 + x^5 + x^6 + \text{etc.})^{\frac{1}{2}}$$

$$= x(1 + x + x^2 + x^3 + x^4 + \text{etc.})^{\frac{1}{2}} = x(1 + y)^{\frac{1}{2}}$$

$$= x(1 + \tfrac{1}{2} y - \tfrac{1}{2} \cdot \tfrac{1}{4} y^2 + \tfrac{1}{2} \cdot \tfrac{1}{4} \cdot \tfrac{1}{6} y^3 - \tfrac{1}{2} \cdot \tfrac{1}{4} \cdot \tfrac{3}{6} \cdot \tfrac{1}{8} y^4 + \text{etc.})$$

$$= x[1 + \tfrac{1}{2}(x + x^2 + x^3 + x^4 + \text{etc.})$$
$$- \tfrac{1}{8}(x^2 + 2x^3 + 3x^4 + \text{etc.})$$
$$+ \tfrac{1}{16}(x^3 + 3x^4 + 6x^5) - \tfrac{1}{128}(x^4 + 4x^5) + \text{etc.}]$$

$$= x \left\{ \begin{array}{r} 1 + \frac{1}{2} x + \frac{1}{2} x^2 + \frac{1}{2} x^3 + \frac{1}{2} x^4 \\ - \frac{1}{8} x^2 - \frac{2}{8} x^3 - \frac{3}{8} x^4 \\ + \frac{1}{16} x^3 + \frac{5}{16} x^4 \\ - \frac{5}{128} x^4 \end{array} \right\}$$

$$= x(1 + \tfrac{1}{2} x + \tfrac{3}{8} x^2 + \tfrac{5}{16} x^3 + \tfrac{35}{128} x^4)$$

$$= x + \tfrac{1}{2} x^2 + \tfrac{3}{8} x^3 + \tfrac{5}{16} x^4 + \tfrac{35}{128} x^5.$$

La moyenne géométrique est donc $x + \frac{1}{2} x^2 + \frac{3}{8} x^3 + \frac{5}{16} x^4 + \frac{35}{128} x^5$,

log sin A $= x + \frac{1}{2} x^2 + \frac{1}{3} x^3 + \frac{1}{4} x^4 + \frac{1}{5} x^5$,

excès du moyen géométrique $= (\frac{3}{8} - \frac{2}{9}) x^3 + (\frac{5}{16} - \frac{4}{16}) x^4 + \frac{47}{640} x^5$,

excès du moyen géométrique $= \frac{1}{24} x^3 + \frac{1}{16} x^4 + \frac{47}{640} x^5$,

excès du moyen arithmétique $= \frac{1}{6} x^3 + \frac{1}{4} x^4 + \frac{5}{10} x^5$.

The play of symbols,—which, to those familiarized with algebraic expressions, is as a glass to the mental eye,—appears to the uninitiated like the

* Delambre.

handwriting on the wall. Referring, therefore, those who wish to fathom the subject, to the works quoted below,* we shall discharge our biographical duty by concluding these Memoirs with a history of the reception of Logarithms, a defence of the author's intellectual rights, and some popular views and original information respecting his mathematical studies.

No sooner did the Canon Mirificus appear than it found, like the Plain Discovery, an able and enthusiastic translator. England did not at the time possess any philosopher whose capacities entitled him to rank in science with such as Kepler and Galileo, or whose labours were so pre-eminent as to attract the eyes of the continent to this island. Scotland was out of the question, where, of those times, generally speaking, he is the most worthy of recollection who was least identified with judicial, feudal, or fanatical murder. But in the sister kingdom, there were one or two conspicuous, in their own country at least, for the highest order of that species of talent, which is rather characterized by acuteness in derivative speculations than eminent success in original discoveries; men, in short, who most deservedly obtain a place in the history of science, but chiefly in connection with some greater genius than their own, to whom they minister. It marks at once the majestic position of our philosopher when we say, that no sooner was his orbit discovered in the system than he was observed to be followed by two such satellites, in *Edward Wright* and *Henry Briggs*, who at the time were Tycho and Kepler to England. Of these, the former ardently set himself to translate the work into English, and the latter became the most enthusiastic co-operator of the author in computing improved tables.

NAVIGATION, like trigonometry, had arrived at the period of its history, beyond which it could not advance without some revolution in science. That scientific art had indeed done wonders without Logarithms; but the very extent of its conquests required such aid to secure them, and bring out all their value. It was only about the middle of the fifteenth century that ma-

* For profound views of the theory of Logarithms, consult the Histories of Astronomy and Mathematics by Montucla and Delambre, already quoted; the History of Logarithms, by Dr Charles Hutton, prefixed to his edition of Sherwin's Tables; Dr Wallis's Treatise of Algebra; a Treatise of Fluxions, by Colin Maclaurin, A. M.; account of Napier's Writings and Inventions by Dr Minto; appendix to a Treatise on Plane and Spherical Trigonometry by Robert Woodhouse, Fellow of Caius College, Cambridge; and above all, Baron Maseres' *Scriptores Logarithmici*, in six volumes quarto. The editio princeps of the Canon is reprinted in the Maseres collection, but without the engraved title-page.

riners began to feel themselves at home upon the deep, when, in addition to the compass, they could derive assistance from mathematical science; and it is melancholy to observe that the country which ranks first in the history of navigation, and once stood so high in the chivalry of Europe, is now the lowest in the scale. Portugal, by her series of unrivalled discoveries, marks the commencement of the grand era of nautical science; and when that nation pointed out the New World, and the passage to India by the Cape of Good Hope, she gave navigation enough to do. One indispensable requisite, in order to secure the benefit of such discoveries, was those scientific sea-maps, or *charts* as they are called, without which the compass itself would be of little value. These had been constructed upon a very imperfect principle, until towards the close of the sixteenth century, when the plane chart began to be superseded by the improvement of *Gerard Mercator*, the well-known geographer of the Low Countries. In the old sea-charts, the nearer the degrees of longitude approach the pole the more they were increased beyond their just proportion, while the degrees of latitude remained the same; and thus false bearings were obtained in nautical geography, and errors pervaded the system. The proposition of Mercator, which has immortalized his name, was to rectify these evils, by augmenting the parallels of latitude in their approach to the pole, in the same proportion as those of the longitude; and he published a chart, constructed upon these principles, about the year 1569. But Montucla, in his History of Navigation, says, that Mercator, although he furnished the idea, was not aware of, and could not demonstrate, the scientific laws of his own scheme, and that this honour was reserved for our countryman, Edward Wright, who was the first to do so, in a treatise printed in London in the year 1599, and entitled, "Certain errors in navigation detected and corrected." Thus Wright is the person to whom, scientifically speaking, Mercator's sailing belongs; and this seems to have been the estimation in which he was held by his contemporaries. One of Napier's poetical eulogists, who designs himself, "the unfained lover and admirer of his art and matchlesse vertue, John Davies of Hereford," when praising the Canon Mirificus, thus suddenly and facetiously apostrophizes its translator:—

> WRIGHT!—ship-wright? no; ship-wright, or righter then
> When wrong she goes,—lo! this, with ease, will make
> Thy rules to make the ship run rightly, when
> She thwarts the main for praise or profit's sake.

We have called Wright the Tycho of England, because in astronomical observations and instruments he outwent all his countrymen. He was ten years younger than Napier, and, after studying at Cambridge, devoted himself entirely to navigation. For the purpose of perfecting himself in that art he accompanied George Earl of Cumberland in his expedition to the Azores, and the fruits of his enterprise was the treatise published in 1599. He was distinguished for his tables of latitudes, his sea-rings, his great quadrant, and his sea-quadrant, besides other ingenious astronomical contrivances. He was also appointed instructor in mathematics to Prince Henry, the young Marcellus of England, whose hopeful promise perished so soon. Montucla derives from Sir Edward Sherburne some details of the life of Wright, and adds, "Il fut enfin (ce que Sherburn a ignoré) un des premiers promoteurs de la theorie et de la pratique des Logarithmes, avec Briggs; car il en avoit construit des tables. Mais sa mort, arrivée vers 1618 ou 1620, l'empêcha de les publiés. Ce fut son fils qui les mit au jour en 1621." But we must, in our turn, correct Montucla. Not only did Edward Wright construct tables connected with Logarithms, but he translated the canon into English the moment it appeared, and his exertions to aid the promulgation seem to have killed him, for he died in the year 1615. So rare are these original editions, that of the two greatest historians of Logarithms, Delambre never saw the Latin edition, and Montucla never heard of the English.

But the interest in the English edition is greatly increased when we understand that it passed through Napier's hands to the press. It appears that some patron of letters had recommended Wright to translate the Canon the moment it was published, who was himself instantly struck with the prospect of the revolution it would effect in navigation, of which, at the time, he unquestionably occupied the *cathedra*. In a preface to Wright's translation we are informed by his son, that he "gave much commendation to this work, and often in my hearing, as of very great use for mariners." This must have been in the first year of its publication, for in that or the following Wright sent Napier the translation for revisal, "and," says his son, "shortly after he had it returned out of Scotland, it pleased God to call him away afore he could publish it."* The task accordingly devolved upon Samuel Wright, with the assistance of Henry Briggs, and the volume was printed in London by Nicholas Okes in 1616. That the most

* There is a Latin memoir of him in the annals of Gonvile and Caius College, Cambridge, which bears, "This year, 1615, died at London, Edward Wright of Garveston in Norfolk, for-

important practical application of Logarithms in human affairs was instantly appreciated appears from the first page of this translation. "To the Right Honourable and Right Worshipful Company of Merchants of London, trading to the East Indies, Samuel Wright wisheth all prosperity in this life, and happiness in the life to come. Your favours towards my deceased father, and your imployment of him in business of this nature, but chiefly your continual imployment of so many mariners, in so many goodly and costly ships, in long and dangerous voyages, for whose use (though many other ways profitable) this little book is chiefly behooveful, may challenge an interest in these his labours. This book is noble by birth, as being descended from a noble parent, and not ignoble by education, having learned to speak English of my late father," &c.

Probably it would be left to Napier to translate his own letter to Prince Charles, and the address to his "*charissimi mathematum cultores*;" and we shall present them to the reader in the English version, which, though not equal in purity of style to the Latin, is quaint and characteristic. As if he had never lost sight of Archimedes for a prototype, * our philosopher addresses the volume.

> "To the Most Noble and Hopeful Prince CHARLES, only son of the High and Mighty James, King of Great Britain, France, and Ireland; Prince of Wales, Duke of York and Rothesay; Great Steward of Scotland, and Lord of the Islands.

"MOST NOBLE PRINCE. Seeing there is neither study nor any kind of learning that doth more acuate and stir up generous and heroical wits to excellent

merly a fellow of this college; a man respected by all for the integrity and simplicity of his manners, and also famous for his skill in the mathematical sciences." After narrating his various scientific labours, the memoir adds, "A little before his death he employed himself about an English translation of the book of Logarithms, then lately found out by the Honourable Baron Napier, a Scotchman, who had a great affection for him. This posthumous work of his was published soon after by his only son Samuel Wright, who was also a scholar of this college. He had formed many other useful designs, but was hindered by death from bringing them to perfection. Of him it may be truly said, that he studied more to serve the public than himself; and though he was rich in fame, and in the promises of the great, yet he died poor, to the scandal of an ungrateful age."—See *Hutton's Hist. of Logarithms*, and *Wilson's Hist. of Navigation*.

* Archimedes is always said to have been a relation of his own Sovereign, Hiero King of Syracuse, and he addressed the *Arenarius* to Prince Gelo, that monarch's eldest son. Napier was unquestionably a relation of James VI.; for the philosopher was the lineal descendant and repre-

and eminent affairs; and contrariewise, that doth more deject and keep down sottish and dull minds than the mathematics; it is no marvel that learned and magnanimous princes in all former ages have taken great delight in them, and that unskilful and slothful men have always pursued them with most cruel hatred, as utter enemies to their ignorance and sluggishness. Why then may not this my new invention (seeing it abhorreth blunt and base natures,) seek and fly unto your Highness' most noble disposition and patronage? and especially seeing this new course of LOGARITHMS doth clean take away all the difficulty that heretofore hath been in mathematicall calculations, (which otherwise might have been distastful to your worthy towardness,) and is so fitted to help the weakness of memory, that by means thereof it is easy to resolve more mathematical questions in one hour's space, than otherwise by that wonted and commonly received manner of sines, tangents, and secants, can be done even in a whole day. And, therefore, this invention (I hope) will be so much the more acceptable to your Highness, as it yieldeth a more easy and speedy way of accompt. For what can be more delightful and more excellent in any kind of learning than to dispatch honourable and profound matters, exactly, readily, and without loss of either time or labour. I crave, therefore, most gracious Prince, that you would, according to your gentleness, accept of this gift, though small and far beneath the height of your deservings and worth, as a pledge and token of my humble service. Which, if I understand you do, you shall, even in this regard only, encourage me, *that am now almost spent with sickness*, shortly to attempt other matters perhaps greater than these, and more worthy so great a Prince. In the mean while, the Supreme King of Kings, and Lord of Lords, long defend and preserve to us the great lights of Great Britain, your renowned parents, and yourself, the noble branch of so noble a stem, and the hope of our future tranquility. To Him be given all honour and glory.

"Your Highness' most devoted Servant,

"JOHN NEPAIR."

This epistle dedicatory is followed by the author's very interesting preface.

"Seeing there is nothing, (right well beloved students in the mathematics,)

sentative of *Margaret*, second daughter of Duncan Earl of Levenax; and the monarch stood in precisely the same relationship (through his father Henry Darnly,) to *Elizabeth*, Earl Duncan's third daughter.

that is so troublesome to mathematical practise, nor that doth more molest and hinder calculations, than the multiplications, divisions, square and cubical extractions of great numbers, which besides the tedious expence of time, are for the most part subject to many slippery errors, *I began, therefore, to consider in my mind*, by what certain and ready art I might remove those hindrances. And having thought upon many things to this purpose, I found at length some excellent brief rules to be treated of perhaps hereafter: But amongst all, none more profitable than this, which together with the hard and tedious multiplications, divisions, and extractions of roots, doth also cast away even the very numbers themselves that are to be multiplied, divided, and resolved into roots, and putteth other numbers in their place which perform as much as they can do, only by addition and substraction, division by two, or division by three. * Which secret invention being, (as all other good things are,) so much the better as it shall be the more common, I thought good heretofore, to set forth in Latin for the public use of mathematicians. But now, some of our countrymen in this island, well affected to these studies, and the more public good, procured a most learned mathematician to translate the same into our vulgar English tongue, who after he had finished it, sent a copy of it to me, to be seen and considered on by myself. I having most willingly and gladly done the same, find it to be most exact and precisely conformable to my mind and the original. Therefore it may please you who are inclined to these studies, to receive it from me and the translator, with as much good will as we recommend it unto you.—*Fare thee well.*"

The philosopher, in the original, adds a Latin verse of his own, which is not given in the translation.

In Logarithmos.

Quæ tibi cunque sinus, tangentes atque secantes
Prolixo præstant, atque labore gravi:
Absque labore gravi, et subitò tibi, candide Lector,
Hæc Logarithmorum parva tabella dabit.

* Woodhouse states in a note to his admirable exposition of the theory of Logarithms, that "the introduction to the English translation of Briggs' Logarithmetical arithmetic 1631, states very plainly and distinctly the uses of Logarithms." But the words which Woodhouse proceeds to quote are just Napier's own statement: he does not appear to have met with either the Latin or English edition of the Canon Mirificus. They are very scarce, and lost sight of in consequence of the tables published since. Of the English edition I have only seen one copy, that in possession of the Lord Napier.

CHAPTER X.

Dr Charles Hutton, in an able history of Logarithms attached to the best English tables, has done great injustice to Napier, both negative and positive. He has, in the first place, not sufficiently distinguished the invention from every other analogous idea that had been previously entertained of progressions, nor shown how undivided is the honour which belongs to Scotland. On the other hand, he has attempted to deprive Napier of the praise of having perfected the system he created; and, what is worse, while erroneously referring that merit to another, he has falsely accused our philosopher,—the lofty cast of whose mind was only equalled by its unpretending modesty,—of a mean attempt to appropriate to himself what was not his due. It would be an omission on the part of his biographer not to place these matters in their proper light, though the character and genius of Napier stand far above such attacks or the necessity of a defence. His character, indeed, is remarkable for purity in the rudest age of his country; he was incapable of meanness, nor would I have been much inclined to notice the groundless insinuations of a modern writer, who knew nothing of Napier's private history, were it not that those insinuations disturb the beautiful picture of friendship and enthusiastic co-operation betwixt Napier and Henry Briggs, which does so much honour to science.

It is well-known to those who have examined the matter scientifically, that Napier viewed and worked his subject under the most difficult aspects, and in the most laborious manner. He had none of those resources, which, if the task were still to be performed, the most fearless calculator of our own times would

be too happy to call to his aid. He had clearly in his mind, however, many of the most valuable analytical principles of a school then unfounded, the school of Newton; and he caused them to bear fruit, without possessing the new modes of analytical inquiry, in the progress of whose subsequent developement those very principles became disclosed to others. This is implied in the words of admiration bestowed upon him by so illustrious a foreigner as Delambre:—"All these means were known to Napier, although he had not the algebraic expressions; he drew his calculus from the resources of his own mind." Napier's innate algebraic power is that which eminently distinguishes him above all the great calculators of his day; the consequence is, that he produced the Logarithms before algebraic analysis reached that point in its progress to which the discovery properly belonged; and we can at the same time detect, in his modes of operation and train of thought, the most striking characteristics of Newton's mind. "At a period," says Playfair, speaking of Napier, "when the nature of series, and when every other resource of which he could avail himself, were so little known, his success argues a depth and originality of thought, which I am persuaded have rarely been surpassed." Thus his invention stands unquestionably more isolated in its glory, and more the undivided property of one individual, than any other with which it can be compared.

Now, Dr Hutton, while he states the properties of progressions, which are the fundamental principles of the system of Logarithms, in a very clear and distinct manner, has at the same time so framed his exposition as to lead any reader, who went no further than this author, to suppose that Napier shared the merit with many others, and only surpassed them in this, that to him "the world is indebted for the first publication of Logarithms." The very able history of them, in which so much at least has been admitted, is in this country perhaps more under the eye of students than any other, and I shall quote the passages to which I allude. "Incessant endeavours at length produced the happy invention of Logarithms, which are of direct and universal application to all numbers abstractedly considered, being derived from a property inherent in themselves. This property may be considered either as the relation between a geometrical series of terms and a corresponding arithmetical one, or as the relation between ratios and the measures of ratios; which comes to much the same thing, they having been conceived in one of these ways by some of

the writers on this subject, and in the other by the rest of them, as well as in both ways at different times by the same writer. A summary idea of this property, and of the probable reflections made on it by the *first writers* * on Logarithms, may be to the following effect. The *learned calculators* about the close of the 16th and beginning of the 17th century, finding the operations of multiplication and division by very long numbers of 7 or 8 places of figures, which they had frequently occasion to perform in solving problems relating to geography and astronomy, to be exceedingly troublesome, *set themselves* to consider whether it was not possible to find some method of lessening this labour, by substituting other easier operations in their stead. In pursuit of this object they reflected that, since in every multiplication by a whole number, the ratio or proportion of the product to the multiplicand is the same as the ratio of the multiplier to unity, it will follow that the ratio of the product to unity (which, according to Euclid's definition of compound ratios, is compounded of the ratios of the said product to the multiplicand and of the multiplier to unity,) must be equal to the sum of the two ratios of the multiplier to unity, and of the multiplicand to unity. Consequently, if they could find a set of artificial numbers that should be the representatives of, or should be proportional to, the ratios of all sorts of numbers to unity, the addition of the two artificial numbers that should represent the ratios of any multiplier and multiplicand to unity, would answer to the multiplication of the said multiplicand by the said multiplier, or the sum arising from the addition of the said representative numbers, would be the representative number of the ratio of the product to unity; and consequently the natural number to which it should be found, in the table of the said artificial or representative numbers, that the said sum belonged, would be the product of the said multiplicand and multiplier. Having settled this principle as the foundation of their wished-for method of abridging the labour of calculations, they resolved to compose a table of such artificial numbers, or numbers that should be representatives of, or proportional to, the ratios of all the common or natural numbers to unity. The first observation that naturally occurred to them in the pursuit of this scheme was, that, whatever artificial numbers should be chosen to represent the ratios of other whole numbers to unity, the ratio of equality, or of unity

* There were no writers on Logarithms, *except Napier*, until the Canon of Logarithms was published. There were plenty of writers on Logarithms after that, and, according to Dr Hutton, these *learned calculators* then *set themselves* to discover the Logarithms.

to unity, must be represented by 0; because *that* ratio has properly no magnitude, since, when it is added to, or subtracted from, any other ratio, it neither increases nor diminishes it. The second observation that occurred to them was, that any number whatever might be chosen at pleasure for the representative of the ratio of any given natural number to unity; but that, when once such choice was made, all the other representative numbers would be thereby determined, because they must be greater or less than that first representative number, in the same proportions in which the ratios represented by them, or the ratios of the corresponding natural numbers to unity, were greater or less than the ratio of the said given natural number to unity. Thus, either 1, or 2, or 3, &c. might be chosen for the representative of the ratio of 10 to 1. But, if 1 be chosen for it, the representatives of the ratios of 100 to 1 and 1000 to 1, which are double and triple of the ratio of 10 to 1, must be 2 and 3, and cannot be any other numbers; and, if 2 be chosen for it, the representatives of the ratios of 100 to 1 and 1000 to 1 will be 4 and 6, and cannot be any other numbers; and, if 3 be chosen for it, the representatives of the ratios of 100 to 1 and 1000 to 1 will be 6 and 9, and cannot be any other numbers; and so on. The third observation that occurred to them was, that, as these artificial numbers were representatives of, or proportional to, ratios of the natural numbers to unity, they must be expressions of the numbers of some smaller equal ratios that are contained in the said ratios. Thus, if 1 be taken for the representative of the ratio of 10 to 1, then 3, which is the representative of the ratio of 1000 to 1, will express the number of ratios of 10 to 1 that are contained in the ratio of 1000 to 1. And if, instead of 1, we make 10,000,000, or ten millions, the representative of the ratio of 10 to 1, (in which case 1 will be the representative of a very small ratio, or *ratiuncula*, which is only the ten-millionth part of the ratio of 10 to 1, or will be the representative of the 10,000,000th root of 10, or of the first or smallest of 9,999,999 mean proportionals interposed between 1 and 10), the representative of the ratio of 1000 to 1, which will in this case be 30,000,000, will express the number of those *ratiunculæ*, or small ratios of the 10,000,000th root of 10 to 1, which are contained in the said ratio of 1000 to 1. And the like may be shown of the representative of the ratio of any other number to unity. And therefore they thought these artificial numbers, which thus represent, or are proportional to, the magnitudes of the ratios of the natural numbers to unity, might not improperly be called the LOGARITHMS of those

ratios, since they express the numbers of smaller ratios of which they are composed. And then, for the sake of brevity, they called them the *Logarithms of the said natural numbers themselves*, which are the antecedents of the said ratios to unity, of which they are in truth the representatives. The foregoing method of considering this property, leads to much the same conclusions as the other way, in which the relations between a geometrical series of terms, and their exponents, or the terms of an arithmetical series, are contemplated. In this latter way, it readily occurred that the addition of the terms of the arithmetical series corresponded to the multiplication of the terms of the geometrical series; and that the arithmeticals would therefore form a set of artificial numbers, which, when arranged in tables with their geometricals, would answer the purposes desired, as has been explained above. From this property, by assuming four quantities, two of them as two terms in a geometrical series, and the others as the two corresponding terms of the arithmeticals, or artificials, or logarithms, it is evident that all the other terms of both the two series may thence be generated. And therefore there may be as many sets or scales of Logarithms as we please, since they depend entirely on the arbitrary assumption of the first two arithmeticals. And all possible natural numbers may be supposed to coincide with some of the terms of any geometrical progression whatever, the Logarithms or arithmeticals determining which of the terms in that progression they are." *

The urgent demand for such a power, universally felt before its appearance, and the prior but obscure knowledge of certain principles connected with that power, may be admitted. But the error (which almost seems premeditated on the part of Dr Hutton) of the above exposition is, that the author has not chosen to discriminate betwixt the Archimedean principle as observed in the European school, and Napier's great discovery, whose merit is to have passed a gulf which that principle had only reached, and which had hitherto rendered it an idle and fruitless speculation. He has traced, indeed, those long barren ideas to their consummation; but he has done so expressly, as if *many* had been at work for years to effect that conquest, and as if the whole system of Logarithms, and the very compounding of the term, did not exclusively belong to one individual. These deliberate speculations of "learned calculators about the close of the sixteenth and beginning of the seventeenth century," are all creations of Dr Hutton's jealousy. No one but Napier can be said to have thus set him-

* Hutton's History of Logarithms.

self to the task, and he alone it was who conceived a table which he at first called a table of *artificial numbers*, and for which he afterwards composed the term Logarithms. We have elsewhere endeavoured to show precisely how far Archimedes went in the doctrine of numerical progressions. Now, until the Canon Mirificus appeared, and that was nearly two thousand years after him of Syracuse, these progressions, and the few speculations about them which occurred after the revival of letters, attracted no scientific admiration, and were unheard of, or uncared for in the world of letters. But when Napier had grafted that astonishing chapter of algebra upon the doctrine, men began to look about them to see if any one shared with him the glory of what was now felt to be an indispensable aid.

Of all others, he who was most astonished, and who was most deserving to have anticipated Napier, was the immortal KEPLER. No greater philosopher ever arose in Germany, or one whose calculating powers were more gigantic and in more constant requisition. At this time he was far advanced on his path to fame, though considerably younger than Napier, and the diffidence of the Scotch philosopher, in withholding his great work from the public for so many years, gave the German ample time to have been the first "to publish Logarithms," had he formed any conception of such a canon. He was born in 1571, in a country where science was considered the most important department of human affairs, and found the richest patronage. Tycho, Galileo, and Kepler, all became professors and public astronomers while they were young men, and thus were not only conscious that the eyes of Europe were turned towards themselves, but being entirely devoted to such pursuits as a profession, and surrounded by their adoring students, and scientific *domestici*, they possessed a never-failing stimulus, and constant practice. Kepler, like the two great contemporaries with whom he is always classed, was the scion of a noble family, which, however, was so reduced in circumstances, that nothing but his towering genius redeemed the young philosopher from falling into menial capacities. He received an excellent learned education, however, through the patronage of the Duke of Wirtemberg, took his degree of master of arts in 1591, and shortly afterwards obtained an astronomical post, which, as he tells us himself, he most unwillingly accepted. This was the chair of astronomy at Gratz, and, strange to say, Kepler felt alarmed that his own ignorance in that branch of science would only bring disgrace upon him. His voluminous correspondence, his works, his prefaces and dedications being all full of himself, we have thus the most minute de-

tails of the progress of his fortunes and his mind. He was not long of discovering that he had entered the path of his fame, and two years after his appointment, produced that cosmographical work which even Tycho condemned as a system of nature singularly imaginative. There was this distinction betwixt the minds of Napier and Kepler, that, although the former has left some indications of being tinged with the superstition which then attached itself to the loftiest geniuses, he seems to have cast it aside in all his serious operations, and did not suffer his mind to be drawn aside from its progress to the Logarithms even by the allurements of magic squares, and the mystical number seven.* But with Kepler's greatest works, his wildest extravagances are lavishly mingled, and we have to seek for the evidences of his immortality, amid his own records of the most extraordinary ideas that ever entered the human imagination. The first discovery which he announced with much complacency to the world was, that in the geometrical solids, namely, the sphere, the dodecahedron, the tetrahedron, the cube, the isosahedron, and the octohedron, he had detected the true reason of the number and arrangement of the planetary system. Such were the almost insane speculations which brought out Kepler's wonderful powers of calculation. "There were," he says, "three things in particular of which I pertinaciously sought the causes why they are not other than they are,—the number, the size, and the motion of the orbits. I attempted the thing at first with numbers, and considered whether one of the orbits might be double, triple, quadruple, or any other multiple of the others; and how much, according to Copernicus, each differed from the rest. I spent a great deal of time in that labour, as if it were mere sport, but could find no equality either in the proportions or the differences, and I gained nothing by this beyond imprinting deeply in my memory the distances as assigned by Copernicus." After succeeding, as he imagined, with his geometrical methods, he declares, that "the intense pleasure I have received from this discovery never can be told in words; I regretted no more the time wasted; I tired of no labour; I shunned no toil of reckoning; days and nights I spent in calculations, until I could see whether this opinion would agree with the orbits of Copernicus, or whether my joy was to

* One of the propositions in Robert Pont's work on the "Last Decaying Age of the World" is, "That there is a merveilous sympathie of periods of times in reckoning by sevens, and by Sabbatical years, and of the manifold mysteries of the number of seven."

vanish into air." * By the time, however, the canon of Logarithms made its appearance, Kepler's mind had atoned for his imagination. Through the most chilling pecuniary difficulties, and the most distracting domestic broils, he struggled onwards to the discovery of those great laws of the planetary orbits, which have obtained for him the daring title of "Legislator of the Heavens." When Tycho was banished from Uranibourg, the moment he found a resting-place for himself and his instruments, he and Longomontanus returned to their observations of the heavenly bodies with the true spirit of philosophers, and with the same ardour as if nothing had happened. Kepler joined them in the year 1600; and in the following was presented by Tycho to his new patron, the Emperor Rodolph, who made it his request that Kepler should assist the great astronomer, and at the same time bestowed upon him the title of Imperial Mathematician. Hence arose Kepler's connection with the *Rudolphine Tables*, the great source of his future labours, and of which we shall afterwards hear something from himself in connection with Napier and Logarithms. Before Kepler knew of that invention, he had passed through most of the calculations of those great astronomical discoveries which have been called Kepler's Laws; and it was immediately after he had published the *Harmonices Mundi*, that we shall find he sat down to address a letter of thanks to Napier for the boon he had presented to the world. And well might Kepler do so notwithstanding all his success. Tycho had left him, among other bequests, the Herculean task of completing his Astronomical or Rudolphine Tables, for which the world of science looked so eagerly and so long. They were the first that were founded on the system of Logarithms; and there was now little chance of the German's finding himself in a dilemma, which once occurred to him. While examining the orbits of the planets, he had adopted a theory, whose results, after great labour, proved unsatisfactory; he commenced the calculations upon a new theory, "but was much astonished at finding the same exactly as on his former hypothesis; the fact was, as he himself discovered, although not until after several years, that he had become confused in his calculation, and when half

* There is an excellent life of Kepler by Mr Drinkwater, who has translated into it copious extracts from Kepler's works and correspondence. He has made great use of the *Kepleri Epistolæ* by Hansch.

through the process, had retraced his steps, so as of course to arrive again at the numbers from which he started." * We must not omit, that, like Napier, Kepler mingled with his scientific labours the study of recondite theology, and also of judicial astrology. His theological studies were not indeed pursued with the devotion and ability of our own philosopher; but he surpassed him in astrology. He pretended, indeed, to a peculiar and purified creed on the subject. "I maintain," says he, "that the colours and aspects, and conjunctions of the planets, are impressed on the natures or faculties of sublunary things, and when they occur, that these are excited as well in forming as in moving the body over whose motion they preside;" after scorning the quacks in astrology, he adds, "A most unfailing experience of the excitement of sublunary natures, by the conjunctions and aspects of the planets, has instructed and compelled my unwilling belief."

Such, generally, was the position in science of the most illustrious and laborious calculator in Europe at the time the Logarithms appeared; and, in reference to Dr Hutton's history, it is material to attend to the first expressions used by Kepler on the subject. He was now in correspondence with every man of science on the Continent; and, in a letter dated 11th March 1618 to his friend Schikhart, after descanting upon the various difficulties and resources of trigonometry, he exclaims, "A Scottish baron has started up, his name I cannot remember, but he has put forth some wonderful mode by which all necessity of multiplications and divisions are commuted to mere additions and subtractions, nor does he make any use of a table of sines; still, however, he requires a canon of tangents, and the variety, frequency, and difficulty of additions and subtractions, in some cases exceed the labour of multiplication and division." † This was the first crude notion formed by Kep-

* Drinkwater.

† "Extitit Scotus Baro, cujus nomen mihi excidit, qui præclari quid præstitit, necessitate omni multiplicationum et divisionum in meras additiones et subtractiones commutata, nec sinibus utitur: at tamen opus est ipsi tangentium canone: et varietas, crebritas, difficultasque additionum subtractionumque alicubi laborem multiplicandi et dividendi superat." Mr Drinkwater, in his Life of Kepler, observes, "the meaning of this passage is not very clear; Kepler evidently had seen and used Logarithms at the time of writing this letter, yet there is nothing in the method to justify this expression, "at tamen opus est *ipsi tangentium canone*." The letter from Kepler to Napier, of which Mr Drinkwater was not aware, and which we shall afterwards quote, may throw some light upon this expression; it certainly proves that Kepler did not peruse Napier's work until the following year, when he instantly caught fire.

ler of a work which he had not as yet examined, but with which all his future labours and fame were to be identified. It would appear from these expressions, that he had not yet heard of that letter to Tycho in the year 1594, which he mentions in a subsequent correspondence with Cugerus; they also afford additional evidence, that the idea of Longomontanus having suggested the invention to Napier in the manner recorded by Wood, can have no foundation, as Longomontanus and Kepler had been fellow-calculators for years, living in the same house together, and if any thing even analogous had been previously imagined by either of them, it must have been instantly recognized.

But where were all the "learned calculators of the 16th and 17th centuries," whom Dr Hutton pictures as evolving the Logarithms by profound reasonings upon the doctrine of progressions? And who were they? Not Kepler, who, when he first heard of Napier's method, could hardly form an accurate idea of its meaning. Not Tycho, nor Longomontanus, nor Galileo, nor any one of Kepler's numerous correspondents, including, we should think, nearly all the learned calculators of the period. At length, however, Kepler, who to his dying day never ceased to marvel at the achievement, seems a little excited by discovering that *one* other person had actually approached the theory without being aware of it. In his Rudolphine Tables, published in the year 1627, he remarks, "the accents in calculation led Justus Byrgius on the way to these very Logarithms many years before Napier's system appeared; but being an indolent man, and very uncommunicative, instead of rearing up his child for the public benefit, he deserted it in the birth." * This was the result of Kepler's indefatigable inquiries, for nine years, as to who had ever thought of the system before, and, giving him the fullest credit for the fact, it amounts to this, that Byrgius had made some observations upon the adaptation of an arithmetical to a geometrical progression, very naturally occurring to him in trigonometrical calculations. The *Apices Logistici*, to which Kepler alludes, are those accents which the Greeks used in order to change the value or mark the order of a symbol, as we use the cypher; and this is particularly exemplified in their sexagesimal division of the circle still in use, where the accents $'$, $''$, $'''$, $''''$, &c. of minutes, seconds, thirds, fourths, &c. are an arithmetical progression denoting the fractional orders, the values of which descend in a ratio of 60, and

* "Apices Logistici, Justo Byrgio, multis annis ante editionem Nepeiranam, viam præiverunt ad hos ipsissimos logarithmos, etsi homo cunctator, et scretorum suorum custos, fœtum in partu destituit, non ad usos publicos educavit."

form the corresponding geometrical progression. It is obvious, however, that Kepler meant no honour to his friend to the prejudice of Napier. On the contrary, the spirit in which he notices the fact, is, that Byrgius had *substantially failed* to perceive that a chapter of algebra might be composed in which that property of progressions would be reared into vast importance; an importance never felt until Napier demonstrated it by a method far more nearly allied to the profound algebraic views of Newton, than those easy progressions,—so obvious in the Arabic scale itself, and through which, perhaps, Byrgius had been unwittingly on a tract to Logarithms,—are to Napier's system.

The mathematician whose claim we are considering ranked not meanly in science; he was instrument-maker and astronomer to the Landgrave of Hesse, and must have been well known to Kepler; he may have been "homo cunctator," but he was not so foolish as to have cast aside his own immortality had he really extended the Archimedean principle in any remarkable manner; he was a public astronomer, under high patronage, in a country teeming with rivals in science, and where a great mathematical discovery was the means of obtaining rank, wealth, and adoration; it is *absolutely impossible*, therefore, that an astronomer of the Landgrave of Hesse could have calculated tables of Logarithms, knowing what he was about, and then have cast them aside; there was the gulf of *ignorance* betwixt him and Logarithms, and so we must construe the expressions of Kepler, "*fœtum in partu destituit, non ad usos publicos educavit.*" Supposing him even to have observed all the curious properties of a corresponding series, under the fertile and flexible Arabic notation,—the parent of progressions,—he would not have been singular in thus obtaining a glimpse of Logarithms without knowing them;* and there

* *Michael Stifels* has a far stronger claim to be named in a history of Logarithms than Justus Byrgius. Montucla records him as an observer of progressions, but will not allow him any share whatever of the honour of Logarithms. He was a Protestant clergyman, born at Eslingen in Saxony, in 1509, who published at Nuremberg, so early as 1544, a very original and philosophical work upon arithmetic and algebra, entitled *Arithmetica Integra*. In this he examines logarithmic properties of corresponding series of numbers, so ingeniously and profoundly that he almost deserves to have made the great discovery. But his mind had not the grasp of Napier's, and fell short even of the conception of bending the whole system of Numbers to these Archimedean principles; consequently, after labouring earnestly at progressions, and talking *con amore* of their properties, his genius dies away into the doctrine of magic squares. So far from interfering with the fame of Napier, he affords the best illustration of the fact that *no hints* could suggest the Logarithms accidentally even to mathematical minds. Napier is the solitary being who said to

would still be this distinction betwixt Byrgius and Napier, that the former, neither seeking nor dreaming of such a power, stumbled upon a natural tract in the system of notation, which might have led him, but *did not*, to an imperfect and accidental developement of Logarithms; whereas the latter saw that the power was wanted, that calculation was impeded, and, to use his own words, "began therefore to consider in my mind by what certain and ready art I might remove those hindrances," and in doing so sought no easy path pointed out to him by the progressive power of *cyphers*, but, plunging at once into the algebraic depth of his own original *fluxionary* system, took the very path which NEWTON and LEIBNITZ would have taken, and returned leading the whole system of Numbers captive to the properties of progressions. The distinguished Playfair, in stating to the full extent those properties as observed before Napier's time, has well expressed the proper appreciation of such prior claims: "Thus far, however," he says, "there was no difficulty, and the discovery might certainly have been made by men much inferior either to Napier or Archimedes. What remained to be done, what Archimedes did not attempt, and what Napier completely performed, involved two great difficulties. It is plain that the resource of the geometrical progression was sufficient when the given numbers were terms of that progression; but if they were not it did not seem that any advantage could be derived from it. Napier, however, perceived, *and it was by no means obvious*, that all numbers whatsoever might be inserted in the progression, and have their places assigned in it. After *conceiving the possibility* of this, the next difficulty was to discover the principle, and to execute the arithmetical process by which these places were to be ascertained. It is in these two points that the peculiar merit of his invention consists." * When this idea occurred to Napier, then, and not till then, were Logarithms conceived; when he set himself to show how such intercalations could be generated, then, and not till

himself I WILL DISCOVER SUCH A POWER, who sat down to the task, and who accomplished it. Sir John Leslie, when speaking of Stifels in his Dissertation, uses a careless expression. "Stifels anticipated some of the later discoveries, pointed out the nature of Logarithms," &c. Napier invented the very term; and that Leslie could mean no more than what we have already conceded to Stifels, is obvious from his saying elsewhere, that "Napier's life, devoted to the improvement of the science of calculation, was crowned by the invention of Logarithms, the noblest conquest ever achieved by man."

* Dissertation.

then, were Logarithms demonstrated; and when he completed the laborious operation of calculating tables constructed upon those principles, then, and not till then, the world was in possession of Logarithms.

Justus Byrgius is the solitary mathematician for whom any thing like an independent claim to the invention has been set up betwixt the time of Archimedes and Napier. Not that it has ever been said that our philosopher borrowed any thing from the German; for the priority of Napier's *publication*, and the surpassing beauty of his algebraic method, has never met with contradiction. But there is a story that Kepler's friend had actually computed tables of Logarithms years before Napier published his canon, and, consequently, that the German stands nearly in the same relation to this great discovery that Newton himself does to the infinitesmal calculus, in the celebrated competition with Leibnitz. It would, indeed, be singular, if this public astronomer had computed such tables without giving them to the world, or ever himself pretending to the discovery. Yet the facts have been imposingly detailed by Montucla in his great history of Mathematics, and hitherto without any refutation. If Dr Hutton, instead of confusing the history of Logarithms to the further detriment of Napier's intellectual rights, by appearing to assume that the conquest, which our philosopher *alone* imagined and accomplished, was the work of many, had refuted the false claim we are about to expose, he would thereby have only done justice to his country.

"There is a geometer," says Montucla, "to whom we must here give a place, and that is, *Juste Byrge*. That which chiefly renders him worthy of notice is the fact, that he invented and constructed tables of Logarithms simultaneously with Napier. Kepler represents him to us as a man of considerable genius, but thinking so modestly of his own inventions, and so indifferent about them, as to suffer them to be buried in the dust of his study; and, says Kepler, for that reason he never gave any thing to the public through the medium of the press.* But Kepler was in error when he said so, and we shall proceed to unfold a tale not a little curious upon that sub-

* This is a very erroneous version of the passage we have already quoted from Kepler's *Tabulæ Rudolphinæ*, and argues *literary* carelessness on the part of Montucla, as may be detected in more than one instance in his great work. It will be perceived that Kepler confines his remark entirely to the extent which Byrgius had evinced his knowledge of Logarithmic properties, and says something totally different from Montucla's paraphrase.—See *supra*, p. 392.

ject.* Notwithstanding what Kepler says of J. Byrge, Benjamin Bramer bears witness to the fact, that he (Byrge) did publish something relative to Logarithms. That author in a German work of his, entitled, *Description of an Instrument very useful for perspective and drawing plans*, (Cassel, 1630, 4to,) says expressly, "It was upon these principles that my dear brother-in-law and master, Juste Byrge, constructed, more than twenty years ago, a beautiful table of progressions, with their differences from 10 to 10, calculated to 9 places, and which he caused to be printed at Prague in 1620, *so that the invention of Logarithms is not Neper's, but was made by Juste Byrge long before him.*"

Upon this unblushing assumption, Montucla continues his remarks. "But the work of this geometer was nowhere to be found, and probably would never have been discovered had not the passage led M. Kästner to recognize these tables among some old mathematical works which he had purchased. They bore this title in German: *Tables of Arithmetical and Geometrical Progressions, with an introduction explanatory of their meaning and use in all manner of Calculations, by J. B. printed in the ancient city of Prague*, 1620. The tables contain seven leaves and a-half, printed in folio, but the introduction announced is awanting, which leads to the conjecture, that some peculiar circumstances had stopped the progress of the work; and, indeed, Bramer informs us in another of his own works, that Juste Byrge contemplated the publication of several of his inventions, and, for that purpose, had his portrait engraved in the year 1619, but the thirty years' war, which unhappily desolated Germany, opposed an obstacle to his design." Montucla then proceeds to give a specimen of the fragment of Byrgius taken from M. Kästner, and concludes his *curious story*, by deigning to extend his illustrious protection thus far over old John of Merchiston. "We must remark at the same time, that it would be unjust to conclude, from the work printed in 1620, that Byrge had invented Logarithms before Neper; for the work of Neper appeared in 1614, and it is the priority of dates of works which determines at the bar of public opinion the anteriority of the invention. How then does Bramer from that date, 1620, arrive at the conclusion, that his brother-in-law had made the discovery long before Napier? It is well known, that the date

* "Mais Kepler étoit dans l'erreur en cela, et nous allons développer ici une anecdote assez curieuse sur ce sujet."

of an invention requiring much calculation is necessarily anterior to that of publication, and Neper is equally entitled to the assumption, that his invention existed in his head for several years before he published it; and besides, in a court of law itself, Byrge would lose his suit, for, according to the strictest administration of justice, a date of publication anterior by six years must be held to have afforded an opportunity of becoming acquainted with the discovery, and disguising it under another form. Let us be contented, therefore, with associating at a distance, and to a certain extent only, Byrge with the *honour* of that ingenious invention; but the *glory* must always belong to Neper." *

Fair and softly, M. Montucla, " de l'Institut National de France, An vii." Britain has but one name by which she can claim her place in that page of the history of physical astronomy, where Tycho, Kepler, Galileo, are recorded, and it is Napier,—Scotland has in him her solitary philosopher *majorum gentium*, and must not part with a ray of his glory. The value of Byrgius's share of any honour in the matter may be expressed by that ghostly symbol which is the soul of Arabic notation, 0. We might say so upon the evidence adduced in his favour, which is totally inadequate to sustain his claim. His brother-in-law is, under the circumstances, not competent evidence; for the peremptory manner in which he springs from so vague a statement to the astounding conclusion, that Byrgius, and not Napier, is the Inventor of Logarithms, proves Bramer to have been either an idiot or a false witness. The miserable fragment of miscalculated tables discovered by Kästner proves nothing, for there is neither description nor claim attached to them, and their date is 1620; and any support which the claim attempted to be reared upon that fragment may seem to obtain from the notice of Kepler (also very vague) is more than neutralized by Kepler himself. But there exists positive evidence against the claim, shadowy as that is, " et nous allons développer ici une anecdote assez curieuse sur ce sujet."

According to Bramer, his kinsman had calculated tables of Logarithms *more than twenty years* before 1630. As he has not fixed the date, we take the assumption as referring to the year 1609. " But," says Kepler, writing in the year 1624, and without the slightest notice of Byrgius, " a certain Scotchman, so early as the year 1594, wrote to Tycho a promise of that *wonderful canon*." According to Bramer, his kinsman, the " homo cunctator,"

* Histoire des Mathematiques, Tom. ii. p. 9, *et infra*.

did so far bestir himself as to have his portrait engraved, in the year 1619, for a frontispiece to his great discoveries, among which, and probably the least, were the Logarithms! In 1620 the fragment of his tables was printed *at Prague*, but without frontispiece or anything else. Now it happens, though Montucla was not aware of the fact, that the very place where Kepler himself first saw a copy of John Napier's Canon Mirificus was THE ANCIENT CITY OF PRAGUE, and this was in the year 1617. Our authority is the letter from Kepler to Napier, with which these Memoirs conclude, and which Montucla had never seen. So the "homo cunctator" calculated tables of Logarithms in 1609, and then cast them among the rubbish of his study; in the year 1617 a copy of Napier's Canon is laid, as the wonder of the day, before Kepler himself, the oracle of European science, in the city of Prague; from that moment Kepler's whole existence is identified with his love of Logarithms, and all that he ever says for his friend Byrgius is, that he *did not* make the discovery; in 1619 (two years after Napier's death,) the "homo cunctator" has his portrait engraved; in 1620 *he is said* to have printed at Prague some isolated and useless fragment of a table, but it is not even pretended that he put forth any claim; ten years afterwards, namely, in 1630, Bramer, brother-in-law to the "homo cunctator," has the effrontery to announce, and without so much as a detailed or explicit account in support of his allegation, that Justus Byrgius, and not John Napier, is the inventor of Logarithms. We regret to add to the name of Montucla, that of another distinguished historian of science, as having been carried by this groundless pretension, which was probably a villanous though weak attempt to wrest the laurels from the grave of a foreigner.* M. Kluegel, in his philosophical dictionary, a work of great ability, records, that "Neper in Scotland, and *Jobst Byrg* in Germany, were the first who, without any intercommunication, calculated tables of Logarithms."† It is some consolation to find, that

* Any one who will take the trouble to examine the table of Byrgius, as given by Montucla in his French work, and Kluegel in his German one, will at once perceive how wretched an affair it is; and how easily it may have been an abortive attempt *to examine* Napier's system, whose secret method of construction was not published until the year 1619, and might not reach Prague for some time afterwards. Kepler himself, as we shall find, wrote in that very year to Napier, entreating, in his own illustrious name, and that of all the scientific men around him, that he would give the world his secret. Where was the "homo cunctator" then? Viewed in every light, the claim for Byrgius is either nonsense or roguery.

† "Neper in Schottland und Jobst Byrg in Deutschland sind die ersten welche, ohne etwas von einander zu wissen, Logarithmische Tafeln berechnet haben."

our philosopher is admitted to an equal share, and has no other competitor. But how happened it, we would ask M. Kluegel, that Kepler gave all the glory to Napier, and none to his own countryman? This same author expresses most graphically the enthusiastic zeal with which the legislator of the stars rushed upon the Logarithms; "Kepler ergriff Nepers Erfindung mit Eifer," —Kepler seized Napier's discovery with enthusiasm,—now Kepler expressly regards the speculation of Byrgius with contempt.

Montucla and Kluegel have, in every other respect, done justice to the illustrious Scotchman. Dr Hutton, actuated it would seem by some feeling of national jealousy, has treated Napier's fame and memory in the most unbecoming manner. Anxious to imbue his students with an idea that those profound and philosophical views which engendered the Logarithms were diffused over all ages, and, towards the consummation, equally shared among many calculators, this author, in the progress of casting every doubt he can upon Napier's intellectual rights, thus winds up his own peculiar examination of the birth of that wonderful invention. "This, however, was no newly discovered property of numbers, but what was always well known to all mathematicians, being treated of in the writings of Euclid, as also by Archimedes, who made great use of it in his *Arenarius*, a treatise on the number of the sands, namely, in assigning the rank or place of those terms of a geometrical series produced from the multiplication together of any of the foregoing terms by the addition of the corresponding terms of the arithmetical series which served as the indices or exponents of the former. And the reason why tables of these numbers were not sooner composed was, that the accuracy and trouble of trigonometrical computation had not sooner rendered them necessary. It is therefore not to be doubted, that, about the close of the sixteenth and beginning of the seventeenth century, many persons had thoughts of such a table of numbers besides the few who are said to have attempted it."* *The reason why tables of Logarithms were not sooner composed was, that they were of no use before the year* 1614, is here solemnly recorded by one who calls himself their historian! The same might, with equal sense and justice, be said of the invention of printing, or of the steam-engine, or of any other mighty impulse which the human mind ever received. It is curious that a mathematical professor (we do not call him a philosopher)

* History of Logarithms, by Charles Hutton, LL. D., F. R. S., and Professor of Mathematics in the Royal Military Academy, Woolwich.

should cause the question,—Would Logarithms have been of no value in the schools of Alexandria? Would Euclid, and Archimedes, and Apollonius, and Hipparchus, and Ptolemy, and Diophantus, not all have seized, like Kepler, the Logarithms *mit Eifer?* A perfect notation in Arithmetic, and the infant Algebra itself came even to the dark ages. Were those gifts *too soon* for Science? In the dusky land of the birth of algebra, had the Logarithms lurked far away at the mysterious fountain of numbers, would no wandering prophet of science, no glorious dealer in immortal merchandize, no Leonardo, or Gerbert, or de Burgo, have brought home that treasure, too, in his bosom rejoicing? When the reviving torch of science first flashed in the hands of Purbach and Regiomontanus, would they have rejected the key of calculation? Had it appeared a century before Napier, would not physical astronomy have been as far advanced in his time as it was a century after, and would not NAPIER have been NEWTON?

But there were *many persons* having thoughts of such a table of numbers *besides the few who are said* to have attempted it! Dr Hutton, in support of this assertion, first tells us, that "*some say* Longomontanus invented Logarithms;" but he dare not give him credit for *much* more than the *idea* of them, being forced to admit, that Longomontanus lived thirty-three years after the publication of the invention, and never hinted a claim. He quotes, however, the story from the *Athenæ Oxonienses*, as if it were to be taken literally; tells us that it is rested upon the authority of Oughtred and Wingate; but without adding that it is not confirmed by the writings of those philosophers. He then clings to Byrgius; "Kepler also says, that one Juste Byrge, assistant astronomer to the Landgrave of Hesse, invented or projected Logarithms long before Neper did, but *that they had never come abroad* on account of the great reservedness of their author with regard to his own compositions."* But Hutton, though he suppresses what so materially qualifies the words of Kepler, and ventures not into the slightest examination of the pretension for Byrgius (who never made it for himself) is fond of the story, and does what he can to fix it upon the legislator of the stars as an unqualified assertion of his; for, speaking of the Rudolphine Tables, our author takes occasion to repeat, "and here it is that he (Kepler) mentions Justus Byrgius as *having had Lo-*

* Is that a fair or true statement of Kepler's expressions *fœtum in partu destituit, non ad usos publicos educavit?* Those expressions amount not to a statement that Byrgius never *published* tables, but that *he never found* the Logarithms.

garithms before Napier published them." These, Longomontanus and Byrgius, are all whom Dr Hutton can find to represent his learned calculators of the sixteenth and seventeenth centuries, who anticipated or coincided with Napier in the discovery. We have already given a few hurried sketches of the great actors in the scientific world, from the revival of letters to the publication of Logarithms, which, though necessarily very imperfect, will be sufficient to meet this unjust appreciation by a modern English author. But he is contradicted by the history of science, ancient and modern, and by every philosopher of greatest name, both in Napier's time and ours. Among the finest characteristics of our philosopher's invention was the unhoped-for manner in which it removed a pressure, long and severely felt, and which might have crushed the temple of science, had that not possessed such a pillar as Kepler. To use the expressions of a distinguished writer, " What all mathematicians were now wishing for, the genius of Neper enabled him to discover; and the invention of Logarithms introduced into the calculations of trigonometry a degree of simplicity and ease, which no man had been so sanguine as to expect." * Kepler, Ursine, Speidell, Gunter, Briggs, Vlacq, Cugerus, Cavalieri, Wolff, Wallis, Halley, Keill, and a host of others, all bear witness against Dr Hutton, in the honourable and enthusiastic manner they acknowledge Napier as the only author of that revolution in science.

It seems, however, that this writer was only paving the way for a more determined attack upon the memory of our philosopher. He notices the English translation of the Canon as having passed through Napier's hands, and also, that there was " a preface by Henry Briggs, of whom we shall presently have occasion to speak more at large, on account of the great share he bore in perfecting the Logarithms;" then he adds, " the note which Baron Napier inserted in this English edition, and which was not in the original, was as follows:—*But because the addition and subtraction of these former numbers may seem somewhat painful, I intend (if it shall please God) in a second edition, to set out such Logarithms as shall make those numbers above written to fall upon decimal numbers, such as,* 100000000, 200000000, 300000000, *&c. which are easy to be added or abated to or from any other number.*—This note (continues Dr Hutton) had reference to the alteration of the scale of Logarithms in such manner, that 1 should become the Logarithm of the ratio of 10 to 1, instead of the number 2.3025851, which Napier

* Review of Woodhouse's Trigonometry.—*Edin. Review*, Vol. xvii. p. 124. 1810.

had made that Logarithm in his table, and which alteration had before been recommended to him by Briggs, as we shall see presently. Napier also inserted a similar remark in his Rabdologia, which he printed at Edinburgh in 1617." After examining various modifications and editions of the tables, our author then proceeds to accuse John Napier of breach of truth, breach of honesty, and breach of friendship. He quotes some extracts from the correspondence of Briggs with Archbishop Usher, and the account which the former himself has given of his first visit to Merchiston, all of which are *directly contradictory* of what he means to found; and these, his own evidence, we shall present against that author in a less garbled form, after abstracting his assertions and accusations. " Mr Henry Briggs, (he says,) not less esteemed for his great probity and other eminent virtues, than for his excellent skill in the mathematics," &c. " appears to be the first person *who formed the idea* of this change in the scale, which he presently and *generously* communicated, both to the public in his lectures, and to Lord Napier himself, who afterwards said, that he also had thought of the same thing." He then quotes the positive declaration of Briggs, that the Logarithms were improved according to Napier's own conception and advice; and yet proceeds: " So it is plain that Briggs was the inventor of the present scale of Logarithms, in which one is the Logarithm of the ratio of 10 to 1, and 2 that of 100 to 1, &c. and that the share which Napier had in them was only advising Briggs to begin at the lowest number, 1," &c. He goes on to depreciate Napier's important modification of the improved plan, notices a preface of Briggs written after our philosopher's death, and quotes this passage from it, " Why these Logarithms differ from those set forth by their most illustrious inventor of ever respectful memory, in his Canon Mirificus, IT IS TO BE HOPED his posthumous work will shortly make appear."

Having laid his foundation by these capital letters, Dr Hutton thus winds up his calumny against the inventor of Logarithms. " As Napier, after communication had with Briggs on the subject of altering the scale of Logarithms, had given notice, both in Wright's translation, and in his own Rabdologia, printed in 1617, of his intention to alter the scale, *(though it appears very plainly that he never intended to compute any more,)* without making any mention of the share which Briggs had in the alteration, this gentleman *modestly gave the above hint.* But not finding any regard paid to it in the said posthumous work, published by Lord Napier's son in 1619,

where the alteration is again adverted to, but still *without any mention of Briggs*, this gentleman thought he could not do less than state the grounds of that alteration himself, as they are above extracted from his work published in 1624. Thus, *upon the whole matter*, it seems evident that Mr Briggs, whether he had thought of this improvement in the construction of Logarithms, of making 1 the Logarithm of the ratio of 10 to 1, before Lord Napier or not *(which is a secret that could be known only to Napier himself,)* was the first person who communicated the idea of such an improvement to the world; and that he did this in his lectures to his auditors at Gresham College in the year 1615, very soon after his perusal of Napier's Canon Mirificus Logarithmorum in the year 1614. He also mentioned it to Napier, both by letter in the same year, and on his *first* visit to him in Scotland in the summer of the year 1616, when Napier approved the idea, and said it had already occurred to himself, and that he had determined to adopt it. It would therefore have been *more candid* in Lord Napier to have told the world in his *second edition of his book*,* that Mr Briggs had mentioned this improvement to him, and that he had thereby been confirmed in the resolution he had already taken before Mr Briggs's communication with him, to adopt it in that his second edition, as better fitted to the decimal notation of arithmetic which was in general use. Such a declaration would have been but a piece of justice to Mr Briggs; and the not having made it cannot but incline us to suspect, that Lord Napier was *desirous that the world should ascribe to him alone the merit* of this very useful improvement of the Logarithms, as well as that of having originally invented them; though, if the having first communicated an invention to the world be sufficient to entitle a man to the honour of having first invented it, Mr Briggs had the better title to be called the first inventor of this happy improvement of Logarithms."

With the partiality which characterizes the whole of his incoherent attack, Dr Hutton studies to keep out of view that the improvement in question is not of the nature of *an invention* at all, but, at best, is a mere derivative idea, readily suggested by the invention of another. "Various systems of Logarithms," says Professor Playfair in his Dissertation, "*it is evident*, may be constructed according to the geometrical progression assumed; and of these,

* Napier never published a second edition of his book; and his son, who gave the world the *Constructio* after the philosopher's death, laments in the preface that his father died even before he had prepared that second edition for the press.

that which was first contrived by Napier, though the simplest and *the foundation of the rest*, was not so convenient for the purposes of calculation as one which soon afterwards occurred, both to himself and his friend Briggs, by whom the actual calculation was performed. The new system of Logarithms was an improvement practically considered; but, in as far as it was connected with the principles of the invention, *it is only of secondary consideration.*" But Dr Hutton seems not to have been qualified to judge betwixt two of the highest minded philosophers in Europe. If Napier, when he expressly declared that he had the improvement in a better shape long before his friend, and upon two separate occasions publicly announced his intention to publish it as his own, did all this in order to wrest the merit from his friend, we must not call him uncandid merely, but a *rogue*. If Briggs was conscious and proud of his own suggestion, and anxious that the world should know it, yet left it to his friend for years to make the acknowledgment, though he half suspected that friend's intention to cheat him, and then, when he found he *had* cheated him, waited for five years longer before he told his story, and after all told it in Napier's favour and not his own, we need not speak of the modesty of Briggs, for he must have been a *fool*. Such is the inevitable result of Dr Hutton's view, and it is a relief to turn to the truth.

Henry Briggs was then the Kepler of England. He was ten years younger than Napier, and was distinguished in navigation and astronomy before the close of the sixteenth century. About the year 1596 he was appointed professor of geometry in the munificent establishment founded by Sir Thomas Gresham, where he devoted himself particularly to astronomy, and became known to the most celebrated men of his day. He was the intimate friend and literary coadjutor of Edward Wright, and also the friend and correspondent of the great James Usher, Archbishop of Armagh. Kepler was the luminary to whom Henry Briggs chiefly looked, until Napier fascinated him. From that moment he continued to revolve round the genius of the Scottish philosopher, so long as his own career lasted; and Napier, in return, called him " my most beloved friend." In Usher's correspondence, there is a letter, dated August 1610, from Briggs to that prelate, an extract from which will best show the nature and inclination of Napier's friend:— " Concerning eclypses, you see by your own experience, that good purposes may in two years be honestly crossed, and, therefore, till you send me your tractate you promised the last year, do not look for much from me, for, if any

other business may excuse, it will serve me too. Yet am I not idle in that kind, for Kepler hath troubled all, and erected a new frame for the motions of all the seven upon a new foundation, making scarce any use of any former hypotheses; yet dare I not much blame him, save that he is tedious and obscure; and at length coming to the point, he hath left out the principal verb. I mean his tables both of middle motion and prosthaphæreseon,* reserving all, as it seemeth, to his Tab. Rudolpheas, setting down only a lame pattern in Mars; but I think I shall scarce with patience expect his next books, unless he speed himself quickly." Little did Briggs then know what was in store for himself and Kepler, and the Rudolphine Tables. Before those long-expected tables were published, the Logarithms appeared; and Kepler, the moment he knew it, unwove his web, and remodelled the work upon this new chapter in science. It must have been early in the year 1614 that the Canon Mirificus issued from the press, because Edward Wright died in 1615, and yet he had completed the translation, sent it to the author in Scotland, and received it back revised before his death. It was then published, as we have already observed, by Samuel Wright, but under the auspices of Briggs, who wrote a preface, wherein he informs us,—" Gentle Reader, seeing I have publicly taught the meaning and use of this book at Gresham-House, and have had some charge about this impression committed unto me, both by the honourable author, the L. of Marchiston, and by my very good friend, Mr Edward Wright, the translator; and seeing the one who hath most right, and is best able to commend it, is so far absent, and the other hath made a most happy change of this place and life for a better; thou mayst haply expect that I should write somewhat that may give some taste of the excellent use of it," &c. The expressions used by Briggs in his first notice of the great discovery to Usher, in a letter, dated Gresham-House, 10th March 1615, are very interesting. After speaking of the Arabic versions of the Greek philosophers,

* " There is a passage in the life of Tycho Brahe by Gassendi, which may mislead an inattentive reader to suppose, that Napier's method had been explored by Herwart at Hoenburg, 'tis in Gassendi's observations on a letter from Tycho to Herwart of that day of August 1599. *Dixit Hervartus nihil morari se solvendi cujusquem trianguli difficultatem; solere se enim multiplicationum ac divisionum vice additiones solum, subtractiones* 93 *usurpare (quod ut fieri posset, docuit postmodum suo Logarithmorum Canone Neperus.)* But Herwart here alludes to his work afterwards published in the year 1610, which solves triangles by Prosthaphæresis,—a mode totally different from that of the Logarithms."—*Account of the Life, &c. of Napier, by Lord Buchan and Dr Minto.*

and also holding some discourse concerning eclipses, he adds, " Napper, Lord of Markinston, hath set my head and hands a work with his new and admirable Logarithms. I hope to see him this summer, if it please God, for I never saw book which pleased me better, or made me more wonder. I purpose to discourse with him concerning eclipses, *for what is there which we may not hope for at his hands.*" * Dr Thomas Smith, the biographer of Usher and Briggs, has painted in vivid colours the state of excitement into which the latter was thrown by the Canon Mirificus. He says, that Ursin, Kepler, Frobenius, Batschius, and others, received it with great honour, but none more so than Briggs. " He cherished it as the apple of his eye; it was ever in his bosom, or his hand, or prest to his heart, and, with greedy eyes and mind absorbed, he perused it again and again. In his study, or in his bed, his whole thoughts were bent upon illustrating it, and bringing it by new stores to the last stage of perfection; and he considered that his thoughts could not be more fruitfully, or beautifully, or gloriously, bestowed than upon this most illustrious discipline; for he regarded all other works as idleness. It was the theme of his praise in familiar conversation with his friends, and, *ex cathedra*, he expounded it to his disciples." †

Napier was prepared for the visit of this enthusiastic disciple some time before Briggs arrived in Scotland, by the presence of one John Marr, a mathematician attached to the household of King James. The philosopher's eldest son was still with his majesty, and by this time had risen to be a privy-councillor. Aware of his father's retiring dispositions, probably he thought it necessary to send John Marr to prepare him to receive England's most ardent and illustrious philosopher, who designed himself the " lover of all them who love the mathematics." ‡ We may imagine how great the ardour must have been that could induce one so completely occupied as Henry Briggs, with the most laborious and varied science, to undertake a journey to Scotland, which in those days Englishmen considered a pilgrimage to the desert. The fact also affords a striking proof, that, whatever ideas might at this time have already occurred to Briggs as to practical improvements in the structure of the system of Lo-

* Usher's Letters, p. 36.

† " Hunc in deliciis habuit, in sinu, in manibus, in pectore gestavit, oculisque avidissimis, et mente attentissima, iterum iterumque perlegit," &c.— *Vita Henrici Briggii, Scriptore Thoma Smith*, p. 6.

‡ Preface to Wright's Translation, by Henry Briggs.

garithms, he considered those ideas merely *derivative*, and by no means of the nature of an independent invention. He had stated them to his class, as he informs us himself, in the year 1615, but thought so little of his discovery as an *intellectual achievement*, that he does not mention the matter in his correspondence to Usher, and took no step in it further than to put his ideas into such a shape as might be fit for inspection by Napier. Him he obviously considered the sole author of Logarithms, whatever shape or structure the system could be made to assume.

It was in the summer of the year 1615, that the English philosopher, the pride of Oxford, and who is recorded in the registers of Alma Mater as "*vir doctrinâ clarus, stupor mathematicorum, moribus ac vitâ integerrimus*," left his studies in London to do homage to the Scotch philosopher. They who know no more of Logarithms than merely to call them "an useful abbreviation of a particular branch of the mathematics," can only regard the ecstacy of Briggs, his caresses of the volume, his adoration of the author, his discussions by day and his study by night, his long journeyings, and his years of toil in that cause, as the conduct of one whom too much learning had rendered mad. A more enlightened view of the subject brings before us the vast results of the system, and we can then better appreciate and respect such enthusiasm. But if we look more closely to the state of the scientific calculus in Napier's day, if we examine the structure of the Canon Mirificus itself, the philosophy of its demonstrations, and the whole developement of this unlooked-for aid, and then compare it with the disjointed and timid unfoldings of algebraic analysis, shared among *many learned calculators* long after Napier's time, we are impressed with the belief, that, in order to produce such an institute, his mind must have been thickly sown with the germs even of the higher calculus, and we feel that his friend was right, as, struck at this first great move in the chaos of calculation, he exclaimed, "for what is there which we may not hope for at his hands."*

* Dr Hutton, while quoting from that letter Briggs's first notice of the Canon Mirificus, suppresses this sentence. But it is material in the question how far Briggs himself credited Napier when the latter said he had anticipated him in the conception of the improvement. It is the author's object to prove that Briggs *did not believe* Napier, and that he endeavoured, after Napier's death, in the weakest manner, to insinuate to the world that Napier had cheated him. But this is a calumny against Henry Briggs no less than against John Napier. Dr Hutton also says that Briggs's first visit to Napier was in the summer of 1616, and thus the latter would have had a

Henry Briggs, journeying on that high mission, before even Kepler knew that science was emancipated, must have felt deeply

—when looking forth
He saw the empress of the north
Sit on her hilly throne;
Her palace's imperial bowers,
Her castle proof to hostile powers,
Her stately halls and holy towers,—

and his heart would beat higher still when first there rose upon his sight the old gray tower of Merchiston. * But with whatever excited feelings he approached the place, they were responded to from the bosom of its illustrious owner. John Marr himself, who was an eye witness of that meeting, described it to William Lilly, King Charles's astrologer, with a graphic minuteness which assures us of the truth of the picture; and Lilly in his life and times thus narrates it to Elias Ashmole. "I will acquaint you with one memorable story related unto me by John Marr, an excellent mathematician and geometrician, whom I conceive you remember. He was servant to King James I. and Charles I. When

twelvemonth to think of his friend's suggestion by letter, without letting him know till they met that he had the improvement before Briggs communicated it. Now the fact is certain, that Briggs followed his letter to Napier as soon as he could in 1615. He says so in his letter to Usher of that year, and as Napier died in the spring of 1617, and Briggs visited him two successive summers, the first visit *must* have been in 1615.

* The reader has been presented with a delineation of Merchiston Tower from the pencil of Williams. What follows is from the pen of Sir Walter Scott. "This fortalice is situated upon the ascent, and nearly about the summit of the eminence called the Borough-moor-head, within a mile and a-half of the city walls. In form it is a square tower of the fourteenth or fifteenth century, with a projection on one side. The top is battlemented, and within the battlements, by a fashion more common in Scotland than in England, arises a small building with a steep roof, like a little stone cottage erected on the top of the tower. This sort of upper storey, rising above the battlements, being frequently of varied form, and adorned with notched gables and with turrets, renders a Scottish tower a much more interesting object than those common in Northumberland, which generally terminate in a flat battlemented roof, without any variety of outline. It is not from the petty incidents of a cruel civil war that Merchiston derives its renown; but as having been the residence of genius and of science. The celebrated John Napier of Merchiston was born in this weather-beaten tower; and a small room in the summit is pointed out as the study in which he secluded himself while engaged in the mathematical researches which led to his great discovery. The battlements of Merchiston tower command an extensive view of great interest and beauty."—*Provincial Antiquities of Scotland.*

Merchiston first published his Logarithms, Mr Briggs, then reader of the astronomy lectures at Gresham College, in London, was so surprised with admiration of them, that he could have no quietness in himself until he had seen that noble person whose only invention they were. He acquaints John Marr therewith, who went in Scotland before Mr Briggs, purposely to be there when these two so learned persons should meet. Mr Briggs appoints a certain day when to meet at Edinburgh, but, failing thereof, Merchiston was fearful he would not come. It happened one day as John Marr and the Lord Napier were speaking of Mr Briggs, 'Oh! John,' saith Merchiston, 'Mr Briggs will not come now;' at the very instant one knocks at the gate, John Marr hasted down, and it proved to be Mr Briggs to his great contentment. He brings Mr Briggs into my Lord's chamber, where almost one quarter of an hour was spent, each beholding other with admiration, before one word was spoken. At last Mr Briggs began,—'My Lord, I have undertaken this long journey purposely to see your person, and to know by what engine of wit or ingenuity you came first to think of this most excellent help unto astronomy, viz. the Logarithms; but, my Lord, being by you found out, I wonder nobody else found it out before, when, now being known, it appears so easy.'* He was nobly entertained by the Lord Napier; and every summer after that, during the Laird's being alive, this venerable man went purposely to Scotland to visit him."

We must now give Briggs's own account of those visits, from which it might have been conceived impossible that envy itself could have extracted anything to disturb the beautiful picture of friendship and intellectual co-operation betwixt these great men. Seven years after Napier's death, Briggs tells us in his preface to the *Arithmetica Logarithmica*, published in London, 1624, "That these Logarithms differ from those which that illustrious man, the Baron of Merchiston, published in his Canon Mirificus, must not surprise you. For I myself, when expounding publicly in London their doctrine to my auditors in Gresham College, remarked that it would be much more convenient that 0 should stand for the Logarithm of the whole sine, as in the Canon Mirificus, but that the Logarithm of the tenth part of the same whole sine, that is to say, 5 degrees, 44 minutes, and 21 seconds should be 10,000,000,000. Concerning that matter, I wrote immediately to

* This interferes with Dr Hutton's fable of the learned calculators of the 16th and 17th centuries.

the author himself; and, as soon as the season of the year and the vacation time of my public duties of instruction permitted, I took journey to Edinburgh, where, being most hospitably received by him, I lingered for a whole month. But as we held discourse concerning this change in the system of Logarithms, *he said, that for a long time he had been sensible of the same thing, and had been anxious to accomplish it,* but that he had published those he had already prepared, until he could construct tables more convenient, if other weighty matters and his frail health would suffer him so to do. But he conceived that the change ought to be effected in this manner, that 0 should become the Logarithm of unity, and 10,000,000,000 that of the whole sine; *which I could not but admit was by far the most convenient of all. So, rejecting those which I had already prepared,* I commenced, *under his encouraging counsel,* to ponder seriously about the calculation of these tables; and in the following summer I again took journey to Edinburgh, where I submitted to him the principal part of those tables which are here published, and I was about to do the same even the third summer, had it pleased God to spare him to us so long." *

* "Quòd Logarithmi isti diversi sunt ab iis quos clarissimus vir, Baro Merchistonii, in suo edidit Canone Mirifico non est quod mereris. Ego enim, cum meis auditoribus Londini, publicè in Collegio Greshamiensi horum doctrinam explicarem, animadverti multo futurum commodius si Logarithmus sinûs totius servaretur 0 (ut in Canone Mirifico) Logarithmus autèm partis decimæ ejusdem sinûs totius, nempe, sinûs 5 graduum, 44 minutorum, et 21 secundorum, esset 10,000,000,000. Atque eâ de re scripsi statim ad ipsum auctorem; et quamprimum per anni tempus et vacationem à publico docendi munere licuit, profectus sum Edinburgum; ubi, humanissimè ab eo acceptus hæsi per integrum mensem. Cum autèm inter nos de horum mutatione sermo haberetur, *ille se idem* DUDUM sensisse et cupivisse dicebat; veruntamen istos, quos jam paraverat, edendos curâsse, donec alios, si per negotia et valetudinem liceret, magis commodos confecisset. Istam aùtem mutationem *ita faciendam censebat* ut 0 esset Logarithmus unitatis, et 10,000,000,000, sinûs totius; *quos ego longè commodissimum esse non potui non agnoscere.* Cœpi igitur, *ejus hortatu* REGECTIS ILLIS QUOS ANTEA PARAVERAM, de horum calculo serio cogitare; et sequenti æstate iterùm profectus Edinburgum, horum quos hîc exhibeo, præcipuos illi ostendi; idem etiam tertiâ æstate facturus, si Deus illum nobis tamdiu superstitem esse voluisset." —Henry Briggs's Address to his Readers; *Arithmetica Logarithmica,* London, 1624.

I have translated the word *dudum* in this passage, "for a long time," because it appears to me that such is its general acceptation and its obvious meaning here. Dr Hutton of course translates "se idem dudum sensisse et cupivisse" in the weakest sense, "he said that he had formerly thought of it, and wished it." Baron Maseres has also animadverted upon Napier for alleged injustice to Briggs. He professes to give an accurate reprint of the passage, but has omitted the word *dudum.* —Scriptores Logarithmici, Vol. vi. pp. 707, 708.

This acknowledgment on the part of Henry Briggs,—that he had no merit, save the zeal and the toil, in bringing Logarithms to perfection,—that the very improvement which struck himself while expounding the canon, and which he had publickly noticed to a London audience, (so that a false impression of his own merit in the matter might have gone abroad,) was in possession of the author himself long before, and in a far preferable form,—that he, Briggs, had therefore cast aside all he had laboured on his own conceptions, and bent his mind to the instructions of the venerable author,—that season after season, until death divided them, he travelled, like the comet to the sun, to draw light from his master, without whose advice and approbation he would not venture one step in his arduous undertaking,—says as much for the heart of Briggs as for the head of Napier.

But Dr Charles Hutton, modelling a view of these facts upon his own mind, has insulted the memory of Henry Briggs, by interpreting that beautiful acknowledgment into a miserably weak defence of literary property alleged to have been pirated by Napier. The passage speaks for itself; but a view of the preliminary circumstances, some of which Dr Hutton has suppressed, while others he has wrested to his own purpose, will render it still more unequivocal.

On the last page of the tables in the original edition of the Canon Mirificus, but neither in the translation nor in any other edition, is the following very interesting sentence from Napier himself, which he titles "Admonition." "Seeing that the calculation of this table, which ought to have been perfected by the labour and pains of many calculators, * has been finished by the ope-

* It cannot be known to those not conversant with the theory and structure of Logarithms, how beautiful is the one, and how laborious the other. Some idea of the labour, however, which Napier had already undergone, and which Briggs was now even more laboriously repeating, may be derived from the words of an able mathematician while examining that change in the system to which our text refers. "There are various artifices and methods for computing Logarithms. But the art of computing Logarithms, and dexterity in that art, would by themselves be of no use in expediting calculation: if, for instance, we had to multiply 31.523 by 17.81, and to divide the product by 5.4312, it would be a most long method of performing the operation to investigate the Logarithms of these numbers: but it is the circumstance of registering computed logarithms in tables, and, by the art of printing, of multiplying such tables, that enables us to compute quickly. The calculation of Logarithms is exceedingly operose; but one man calculates for thousands, and the results of tedious operations are made subservient to the abridgement of similar ones." WOODHOUSE, *Treatise on Trigonometry*, p. 167.

ration and industry of *one alone*, it is not surprising if many errors have crept into them. I beseech you, benevolent readers, pardon these, whether caused by the weariness of computation or an oversight of the press; for, as for me, declining health, and weightier matters have prevented my adding the last finish. But if I shall understand that the use of this invention proves acceptable to the learned, I will, perhaps, shortly give (God willing) the philosophy, and method either of *amending this Canon, or of constructing a new one upon a better plan*; so that through the diligence of many calculators, a Canon more highly finished and accurate than the work of a single individual could effect, may at length see the light. NOTHING IS PERFECT AT ITS BIRTH."* It cannot be doubted, when we couple this sentence with Napier's subsequent declaration of having for a long time conceived a better system of Logarithms, that he here alludes to the very improvement afterwards adopted; now the sentence is printed in the first edition from which Briggs expounded the Logarithms at Gresham College when the idea struck himself, and Dr Hutton takes no notice of it whatever.

In the English translation, which appeared in 1616, the sentence quoted above is omitted. Had Napier been capable of cheating his friend, that sentence, which *appears* at least to refer to the improvement, would have been retained. The reason it was omitted is obvious: the revised translation was subsequent to the meeting of Briggs with Napier: the acuteness of the former, though it had not led him to the precise mode of Napier's improvement, had very nearly done so: this necessarily brought the matter to a point, and accordingly, instead of the "Admonitio" in the Latin copy, Napier inserted that new sentence in the translation which states explicitly the improvement in the terms

* ADMONITIO. Quum hujus tabulæ calculus, qui plurimorum Logistarum ope et diligentia perfici debuisset, unius tantum opera et industria absolutus sit, non mirum est si plurimi errores in eam irrepserint. Hisce igitur, sive a Logistæ lassitudine, sive typographi incuria profectis ignoscant, obsecro, benevoli lectores: me enim tum infirma valetudo, tum rerum graviorum cura præpedivit, quo minus secundam his curam adhiberem. Verùm si hujus inventi usum eruditis gratum fore intellexero, dabo fortasse brevi (Deo aspirante) rationem ac methodum aut hunc canonem emendandi, aut emendatiorem de novo condendi, ut ita plurium Logistarum diligentia, limatior tandem et accuratior, quam unius opera fieri potuit in lucem prodeat. NIHIL IN ORTU PERFECTUM."

I have seen a copy of the Canon Mirificus bearing the date 1614 on the title-page, but without this *admonitio* on the last leaf.

we have already quoted from Dr Hutton's pages. Henry Briggs himself took the charge of bringing out that translation in London, and wrote a preface to it, in which he claims nothing, hints no injustice done to himself, praises the author exceedingly, and adds, " and if it shall please God (who besides his other mercies hath granted this honour unto the author to begin and thus far to accomplish this admirable work), further to grant unto him life and competent strength, I doubt not we shall have the work so enlarged and perfected that we may use it, both with greater ease and with exactness unto the 10th place."

In 1617, Napier, in a letter to the Earl of Dunfermline prefixed to another publication, again asserts, without any qualification or contradiction, that he had invented the common Logarithms, and meant to publish the new method. He had arrived at his great invention in the progress of *conquering the whole system of numbers*. It was a chapter or a section only of a comprehensive work, and this, to a wonderful extent, he had already performed independent of the Logarithms, the importance and labour of which, however, occupied his last years and brought them too soon to a close. In the progress of this work, mechanical contrivances for relieving the difficulties of computing had not escaped him. From his extensive reading (in an age when books and those who loved them were rare in Scotland,) he gathered, that in Greece, and elsewhere, the *abacus* and other modes of palpable arithmetic had been in use for practical purposes. He saw that such contrivances were far beneath the dignity and power of intellectual operations, but his genius neglected nothing, so in passing he remodelled that chapter too, and enriched it with new stores. Both during the progress of the Canon Mirificus, and afterwards, he had contrived a variety of these methods, of which the most important was RABDOLOGIA, or the art of computing by means of figured rods, better known by the name of *Neper's bones*. These inventions he had not at first considered worthy of publication, but having communicated them to his friends, they were beginning to be known both in this country and abroad, and of course in danger of being pirated. The learned Alexander Seton, Earl of Dunfermline, was then Lord High Chancellor of Scotland, and the friend and warm admirer of Napier. At his instigation our philosopher collected the most important of his minor inventions in a profound Latin digest of various numerical properties. This elegant little volume, now rarely to be met with, he dedicated to the Chancellor by a Latin epistle, of which the following is the substance.

To the most illustrious Alexander Seton, Earl of Dunfermline, Lord of Fyvy and Urquhart, High Chancellor of Scotland, &c.

The difficulty and prolixity of calculation, (most illustrious Sir) the weariness of which is so apt to deter from the study of mathematics, I have always, with what powers and little genius I possess, laboured to eradicate. And with that end in view, I published of late years the Canon of Logarithms, wrought out by myself a long time ago, which, casting aside the natural numbers, and the more difficult operations performed by them, substitutes in their place others affording the same results, by means of easy additions, subtractions, bisections, and trisections. Of which Logarithms, indeed, I have now found out another species much superior to the former, and intend, if God shall grant me longer life, and the possession of health, to make known the method of constructing, as well as the manner of using them. But the actual computation of this new Canon, I have left, on account of the infirmity of my bodily health, to those versant in such studies; and especially to that truly most learned man, Henry Briggs, public professor of geometry in London, my most beloved friend. * In the mean time, however, for the sake of those who prefer to work with the natural numbers as they stand, I have excogitated three other compendious modes of calculation, of which the first is by means of numerating rods, and these I have called RABDOLOGIA. Another, by far the most expeditious of all for multiplication, and which on that account I have not inaptly called the *promptuary of multiplication*, is by means of little plates of metal disposed in a box. And lastly, a third method, namely *local arithmetic* performed upon a chess-board. I was chiefly impelled, however, to the publication of this little work concerning the mechanism and use of the rods, not merely in consequence of finding that many were so pleased with them

* "Difficultatem et prolixitatem calculi (vir illustrissime) cujus tædium plurimos à studio mathematum deterrere solet, ego semper, pro viribus et ingenii modulo, conatus sum è medio tollere. Atque hoc mihi fine proposito, Logarithmorum canonem, a me longo tempore elaboratum, superioribus annis edendum curavi," &c. "quorum quidem Logarithmorum speciem aliam multò præstantiorem nunc etiam invenimus, et creandi methodum, una cum eorum usu (si Deus longiorem vitæ et valetudinis usuram concesserit) evulgare statuimus: ipsam autem novi canonis supputationem, ob infirmam corporis nostri valetudinem, viris in hoc studii genere versatis relinquimus; imprimis vero doctissimo viro D. Henrico Briggio, Londini publico Geometriæ Professori, et amico mihi longe charissimo," &c.

that they are already almost common, and even carried to foreign countries; but because it also reached my ears, that your kindness advised me so to do, lest they should be published in the name of another, and I be compelled to sing with Virgil,

Hos ego versiculos feci, &c.

And this very friendly counsel from your Lordship ought to have the greatest weight with me; though most assuredly, but for that, this little book of rods (to which the other two compendious methods are added) would scarcely have seen the light. If, therefore, any thanks be due from the students of mathematics for these little books, they all belong to you as your just right, my noble Lord, to whom, indeed, they must spontaneously fly, not only as patron, but a second parent: especially since I am assured that you have done these rods of mine such high honour, as to have them framed not of vulgar materials, but of silver. Accept, therefore, my Lord, in good part, this small work such as it is; and, though it be not worthy of so great a Mecænas, take it under your patronage as a child of your own. And so I earnestly pray God to preserve you long to us and the state, to preside over justice and equity.

" Your Lordship's most obedient,

" JOHN NAPIER,

" *Baron of Merchiston.*"

The date of the volume to which this letter is attached is 1617, and Napier died upon the 4th of April in that year. This unfortunate bereavement left the men of letters, in his own country at least, very anxious lest they should also lose those methods of constructing Logarithms which he had promised. His son Robert, a young man of a singular turn of mind, but somewhat imbued with the habits and talents of his father, was, however, naturally backward in attempting the difficult task of preparing for publication the most profound of his father's works, which had not been left in the state that the author meant the public to see them. Napier himself, who long delayed the publication of the Canon, in various passages evinces anxiety as to its reception, and holds out only a conditional promise of giving the world the secret of constructing it. The most important works were then but slowly spread abroad; and during the few remaining years of his life, our philosopher had not received sufficient assurance of the approbation of foreign philosophers to

make him hasten to publish the *Constructio*. But Henry Briggs was still indefatigable in the cause. About the close of the same year in which Napier died, he published, under the title of *Logarithmorum Chilias Prima*, the first part of that work which he had been on the eve of submitting to Napier in person for the third time. It is in the preface to this that the words occur, "Why these Logarithms differ from those set forth by their most illustrious inventor, of ever respectful memory, in his *Canon Mirificus*, IT IS TO BE HOPED, his posthumous work will shortly make appear." By those capital letters, Dr Hutton means to call particular attention to the fact, that Briggs "modestly hints" that justice ought to be done to himself!—a view of the matter deficient both in sense and dignity. Since Briggs first expounded the Logarithms at Gresham College in 1615, his days and nights had been spent in admiration of Napier. As for his own share in the improvement, he had announced it to a London audience the moment it struck him. Had that been the object of his solicitude, it was secured so far, and he might have published it at any time, in any other shape he pleased. But such an idea never entered his mind. He had long ago yielded even that merit to the superior sagacity of the author himself, and now he was only expressing, in common with other philosophers, a hope *that the world would not be deprived by Napier's death of the promised method of Construction*. Robert Napier was hesitating about the publication some time afterwards, and did not produce it until the year 1619. But in the year of Napier's death, Kepler first saw the Canon Mirificus at Prague when he was too preoccupied to pay it much attention. In the year 1618, he looked at it more closely, and his very soul was stirred within him. He displayed the same enthusiasm in Germany that Briggs did in England, and would, like him, willingly have fallen at Napier's feet. His Ephemerides, his Rudolphine Tables, and all his calculations were to be remodelled upon the new system; for the rest of his life, Kepler was the very Don Quixote of Logarithms; and, if an old philosopher within the four corners of Germany dared to croak a doubt as to their purity, Kepler shivered his spear on him in an instant. It may be supposed that one so ardent would not be long of communicating in some shape or other with the author. So the German, having struggled to master the subject, by plunging as usual into a sea of calculation, sat down to relieve his overflowing mind in a letter addressed to John Napier, who for two years had been in his grave. To this characteristic epistle we shall return. It may be mentioned here, however, that Kepler therein expresses the greatest anxiety to see the

method of construction; and he adds, that such being the earnest desire of himself and other philosophers in Germany, Napier was bound to redeem his pledge given to the public on those conditions. Now it was in 1619, the year of Kepler's letter, that our philosopher's posthumous work appeared, and it is not unlikely that this letter, or some previous report of the warm admiration of Ursin and Kepler, had the greatest influence in bringing it to light. If he had lived to publish his own work, there is no doubt that he would have mentioned Briggs in the most affectionate terms, as is evident from the manner in which he refers to him elsewhere. Independently of being a gentleman and a philosopher, he entertained punctilious views upon the subject of literary property,* and in the letter to the Earl of Dunfermline, while taking unqualified credit for the invention of the new method of Logarithms, he speaks of the risk of literary piracy as a reason for publishing his Rabdologia. Are we to take from Dr Hutton the mean view of this illustrious man, that in the very same letter he was pirating from his "amico longe charissimo?"

But this author has also said, that "in the posthumous work published by Lord Napier's son in 1619, the alteration is again adverted to, but still without any mention of Briggs." This is equally unjust to Robert Napier; the assertion is not borne out by the fact, and we must exonerate the Rosicrucian son of our philosopher, by quoting the substance of the very elegant Latin address with which he prefaces his father's fragments. "Some years ago, my father, of ever venerated memory, published the use of the wonderful Canon of Logarithms; but the construction and method of generating it, he, for certain reasons, was unwilling to commit to types, as he mentions upon the seventh and the last pages of the Logarithms, until he knew how it was judged of and criticised by those who are versed in this department of letters. But since his death, I have been assured from undoubted authority, that this new invention is much thought of by the most able mathematicians; and that nothing would delight them more than if the construction of his wonderful Canon, or so much at least as might suffice to illustrate it, were published for the benefit of the world. Although, therefore, it is very manifest to me that the author has not put his last finish

* The French translator of the Plain Discovery thus addresses his readers in a conspicuous advertisement. "D'autant que j'ay mis quelques additions en plusieurs endroits tant du premier que du second Traicté du Sieur de Merchiston sur l'Apocalypse, et que sa volonté est que je marque ce que j'ay adjousté, afin qu'il soit separé d'avec ce qui est de luy: le lecteur sera adverti que ce qui trouvera en marge marqué de cette estoille*, est de moy, et non de l'autheur de ce livre."

to this little work, yet I have done what in me lay to satisfy their laudable desires, as well as to afford some assistance, especially to those who are weak in such studies, and apt to stick at the very threshold. I doubt not, however, that this posthumous work would have seen the light in a far more perfect and finished state, if to the author himself, my dearest father,—who, according to the opinion of the best judges, possessed among other illustrious gifts this in particular, that he could explicate the most difficult matter by some sure and easy method, and in the fewest words,—God had granted a longer use of life. You have, then, (benevolent reader,) the doctrine of the construction of Logarithms—which, here, he calls artificial numbers, for he had this treatise beside him composed for several years before he invented the word Logarithms, —most copiously unfolded, and their nature, accidences, and various adaptations to their natural numbers, perspicuously demonstrated. I have also thought good to subjoin to the construction itself a certain appendix, concerning the method of forming another and more excellent species of Logarithms, to which the inventor himself alludes in his epistle prefixed to the Rabdologia, and in which the Logarithm of unity is 0. The treatise which comes last is that which, tending to the utmost perfection of his logarithmic trigonometry, was the fruit of his latest toil, namely, certain very remarkable propositions for resolving spherical triangles, without the necessity of dividing them into quadrantal or rectangular triangles, and which are absolutely general. These, indeed, he intended to have reduced to order, and to have successively demonstrated, had not death snatched him from us too soon. I have also published some lucubrations upon these propositions, and upon the new species of Logarithms, by that most excellent mathematician, Henry Briggs, public professor in London, who undertook most willingly the very severe labour of calculating this Canon, in consequence of the singular affection that existed betwixt him and my father of illustrious memory,—the method of construction and explanation of its use being left to the inventor himself. But now, since he has been called from this life, the whole burden of the business seems to have fallen on the shoulders of the most learned Briggs, as if it were his peculiar destiny to adorn this Sparta.* In the meanwhile, reader, enjoy these labours such as they are, and receive them in good part. Farewell.

"ROBERT NEPER."

* "Qui novi hujus Canonis supputandi laborem gravissimum, pro singulari amicitia quæ illi cum

It will be observed, that in all the notices of the new system of Logarithms, either in our philosopher's own words or his son's, there is not the slightest indication of any competitor for the invention. If a doubt upon the subject existed then, the story which Briggs so candidly told in 1624 would have been told by the Baron himself. Had he done so precisely in the words used by the Savilian professor, and without contradiction, it must have been received as complete evidence of his invention of the common Logarithms. But Napier's right was undisputed. The date of his posthumous work is 1619, two years after his death, and two years after those expressions used by Briggs in the preface to his *Chilias Prima*, which have been interpreted into a modest hint for the protection of his literary property. Yet he attests the truth of Robert Napier's statement, by adding his own lucubrations to the work, and aiding most materially its publication. He then proceeded in his Herculean task of calculating and illustrating Napier's new system, as the preface to the *Constructio* intimates, and in 1624 produced his own greatest work the *Arithmetica Logarithmica*.

There is very interesting evidence still extant that the most perfect cordiality prevailed betwixt Robert Napier and Briggs long after our philosopher's death; and that the Savilian professor, in the progress of his great work, continued to call to his aid as much of the genius of the master he had lost as he could command. Napier left a mass of papers, including his mathematical treatises and notes, all of which came into the possession of Robert as his father's literary executor. When the house of Napier of Culcreugh was burnt, these papers perished, with only two exceptions that I have been able to discover. The one is. the manuscript treatise on Alchemy by Robert Napier himself; but the other is a far more valuable manuscript, being entitled, "The Baron of Merchiston, his booke of Arithmeticke, and Algebra; for Mr Henrie Briggs, Professor of Geometrie at Oxforde." This very curious work was presented to Francis V. Lord Napier, by the then Napier of Culcreugh, probably at the time his Lordship contemplated writing a life of his great ancestor, and it has lain in the Merchiston charter-chest

patre meo L. M. intercessit, animo libentissimo in se suscepit; creandi methodo et usuum explanatione Inventori relictis. Nunc autem ipso ex hâc vitâ evocato, totius negotii onus doctissimi Briggii humeris incumbere, et Sparta hæc ornanda illi sorte quadam obtigisse videtur."

ever since unknown to the world. Reserving a more particular account of it for the supplementary review of our philosopher's mathematical works, we may notice here, that it is of great length, beautifully written in the hand of his son, who mentions the fact, that it is copied from such of his father's notes as the transcriber considered " orderlie sett doun." It is material to observe in reference to what we have been considering, that it bears expressly to have been written out by Robert Napier for Henry Briggs, and after the latter had been appointed to the Savilian chair, which appointment took place in the year 1619. It seems not unlikely that it had been sent to Briggs while he was in the progress of his great work, and we shall have to consider afterwards a very remarkable and interesting coincidence in reference to that idea. But we have thus unquestionable evidence, that from the time when Briggs first expounded the Canon Mirificus to his scholars at Gresham House, to the period when he published the Arithmetica Logarithmica, he continued to regard our philosopher as his guide, and no cloud but that of death ever past betwixt them. The noble work of Henry Briggs becomes doubly interesting when we view it, not merely as a stupendous monument of his own mathematical powers and industry, but as containing more or less of the reflection of the mind of his master. As if to confirm Robert Napier's classical allusion, Briggs, not merely in his preface, but in the dedication, and on the title-page of that work, anxiously announces it as the fruits of Napier's genius, expanded and illustrated according to Napier's own desire. It is dedicated, like the Canon Mirificus, to Prince Charles, whom the courtly professor thus addresses:—" Most potent Prince, not the rarity and beauty, not the mingled usefulness and infinite delectation of the theme, could have persuaded me to the presumption of dedicating these, my mathematical commentaries, to your royal highness, had not that illustrious man, John Napier, Baron of Merchiston, the Inventor of these Logarithms, when he first brought them to light committed the patronage of them to your well known authority and virtue. In respect of that circumstance, indeed, even these, however inferior they may appear at the first glance, shall not be unworthy to be seen and handled by all mathematicians,—especially since it has pleased God (after bestowing the light of the Gospel upon the world) to communicate to us many inventions useful to human life, of which there were no vestiges among the ancients, and that, as of these what appertains

to mathematics holds the highest rank, so in the mathematics Logarithms are supereminent, whether we regard the penetration of the discovery, or the excellence of its practical application," &c. *

All the distinction which Briggs had reached before his companionship with Napier was nothing compared to what he attained afterwards, though he was about sixty years of age when he first visited Merchiston. In 1592 he was a lecturer at Cambridge. When Gresham College was founded in 1596, his high mathematical reputation obtained for him the first professorship of geometry there. In 1609 he was honoured with the correspondence of Usher. In 1610 he was "discoursing concerning eclipses" with that prelate, and anxiously watching and waiting for the works of Kepler. By this time he had only published "A Table to find the Height of the Pole, the magnetic declination being given," besides tables for the improvement of navigation; and he was generally distinguished as the best mathematician in England. But in 1614 a new path was opened to him. Then, said he, "Napper, Lord of Markinston, hath set my head and hands a work with his new and admirable Logarithms;" and from that moment, old as he was, his career of fame may be said only to have commenced, for its proudest orbit was round the sphere of Napier. In 1615 he staid a month at Merchiston, discoursing of numbers. He had not contemplated so long a visit; but "*hæsi per integrum mensem*,"—he found a mind that fascinated him, and he drunk deeply of its lore. In 1616 he repeated his visit. In 1617, again, his anxious steps were turned northward, but the star of his attraction had disappeared. In that year, however, Briggs published "Logarithmorum Chilias Prima;" and in 1619, "Lucubrationes et Annotationes in Opera Posthuma J. Neperi." He was then appointed the first Savilian Professor of Geometry at Oxford. There, in Merton College, he devoted his gray head to the arduous computation of Logarithms. In 1624 he published his "Arithmetica Logarithmica." In 1630 he died, and his posthumous works, published shortly after, were all on the subjects he had discussed with Napier at

* The title-page gives both the original invention and the new system expressly to Napier. "Hos numeros primus invenit clarissimus vir Johannes Neperus, Baro Merchistonii; eos autem *ex ejusdem sententia* mutavit, eorumque ortum et usum illustravit Henricus Briggius, in celeberrima Academia Oxoniensi Geometriæ, Professor Savilianus." Is this the language he would have used had he been, as alleged, suffering under the injustice of Napier for nine years!

Merchiston, and that companionship aided most materially the memory he has left at Merton College, "*stupor mathematicorum.*"

But, says Dr Hutton, in his account of Henry Briggs, "One of his successors at Gresham College, the learned Dr Isaac Barrow, in his oration there upon his admission, has drawn his character more fully; celebrating his great abilities, skill, and industry, particularly in perfecting the invention of Logarithms, which, without his care and pains, might *have continued an imperfect and useless design.*" * Nonsense, when skilfully mingled, seasons to advantage a Latin oration. But it was not fair in Dr Hutton thus gravely, in a philosophical work, to take Dr Barrow at his word. How shocked would Henry Briggs have been at the injustice,—how astonished at the absurdity of this eulogy! Napier, who only required health and prolonged life to have added to his own invention all and more than his friend lived to accomplish, produced a work which nothing but the total submersion of letters could have rendered an imperfect and useless design. His concluding words, in the Canon Mirificus, are far from being an exaggerated estimate of the boon he presented to the world. "Now, therefore," says he, "it hath been sufficiently showed *that there are Logarithms, what they are, and of what use they are;* for with help of them, we have both demonstratively showed and taught, by examples of both kinds of trigonometry, that the arithmetical solution of any geometrical question may most readily be performed without trouble of multiplication, division, or extraction of roots. You have, therefore, the admirable table of Logarithms that was promised, together with the most plentiful use thereof, which, if (to you of the learned sort) I shall by your letters understand to be acceptable to you, I

* Hutton's Math. and Phil. Dict., Art. *Briggs.* As a defence for Dr Barrow, we have sought out his Latin oration alluded to, and here is the passage: "Attestor tuum quod nostris agmen ducit in tabulis omni laude majus omnique encomio celebratus nomen, doctrinâ, acumine, solertia præstantissime Briggi. Tu qui Logarithmorum illud præclarissimum artificium *non tua quidem (quod ad gloriam maxime fecerit) reperisti fortuna,* sed, quod *æquè* laudem meretur, consummasti industria atque omnibus numeris absolvisti, *quod inutile forsan adhuc et imperfectum jaceret opus* fundimenti sui rudibus obvolutum, nisi subtilissimi tu lunam ingenii et indefessæ diligentiam manus adhibuisses."—*Isaaci Barrow, Opuscula.* Dr Hutton takes care not to notice that the compliment in this passage is, by an admission a little ludicrous, greater to Napier than to Briggs. We shall not translate it, as Dr Barrow never meant his Oration to be done into English.

shall be encouraged to set forth also the way to make the table. In the meantime, make use of this short treatise, and give all praise and glory to God, the high Inventor and Guider of all good works." * And Dr Hutton himself, with the inconsistency of error, confirms this estimate, when he calls the Canon Mirificus " a *perfect work* on this kind of Logarithms, containing, in effect, the Logarithms of all numbers, and the Logarithmic sines, tangents, and secants for every minute of the quadrant, together with the description and uses of the tables, as also his definition and idea of Logarithms."† By that work alone the science of trigonometry was emancipated. It was the opening of a fountain that could never run dry, and the sage who struck the rock was he who improved the source. Had Henry Briggs never breathed, England would have lost a philosopher, and Napier a friend, but the Logarithms would have been as they are. There were Gunter, Gellibrand, and Speidell in England, Wingate and Henrion in France, Ursin and Kepler in Germany, Vlacq in Holland, Cavalieri in Italy, names all identified with the promulgation of Logarithms, and contemporary with their author. If Napier's system can be imagined to have escaped these contemporaries, would Mercator, Wallis, Gregory, Halley, Sir Isaac Newton, Cotes, Taylor, Leibtnitz, Euler, Wolff, Maclaurin, names all identified in their brightest phases with the philosophy of Logarithms, have suffered the Canon Mirificus to disappear with the fragment of Byrgius?

I have been anxious to place this *modern* depreciation of Napier's character and merit in its proper light for several reasons. It disturbed the view of his lofty and spotless character, and rendered no longer true his eulogy by the most philosophical and elegant historian of England,—that he is " the person to whom the title of a GREAT MAN is more justly due than to any other whom his country ever produced." It destroyed the beautiful picture of friendship betwixt him and Henry Briggs; and it mutilated an important feature in the history of his great discovery. The system he created was susceptible of one, and but one, material improvement. If it received that, too, from himself, it was essential to prove the fact even had his honour not been involved in the question. No other instance can be pointed to in the progress of human

* English translation of the Canon Mirificus, 1616. P. 89.

† Hutton's History of Logarithms, p. 24. edit. 1785.

knowledge, where an impulse so great, and a power so unlimited, have resulted from the *premeditated* achievement of a solitary individual, whose system was perfected at once and without a rival. His improvement superseded his original Canon, but that, so far from perishing, has found its *apotheosis* in the higher calculus. To distinguish these systems, the illustrious name of Briggs may be justly associated with the common Logarithms, because, "*Sparta hæc ornanda illi sorte quadam obtigisse videtur.*" But the modern expressions, which speak of "the very great improvement that necessarily ensued on Briggs' alteration of the Logarithmic Base;" * and of "Naperean Logarithms," as opposed to the "system of Briggs," are inconsistent with the history of the invention, and must be met with the reply, that in respect of system, ALL LOGARITHMS ARE NAPEREAN." †

The spot where our philosopher lies interred is not certainly known, and the tradition of his descendants, that he was buried in the church of St Giles, (where some of the family monuments still exist) has been lately questioned. The parish records of Scotland are not in a state to solve the doubt, nor have I been able to obtain any evidence on the subject which seems so good as that contained in a letter by Professor Wallace to the Antiquaries of Scotland. After passing an enthusiastic encomium upon the character and genius of our philosopher, and noticing the turbulent and unpropitious atmosphere in which he held his being, the professor proceeds to record this evidence:

"ON THE BURIAL PLACE OF NAPIER OF MERCHISTON.

"It is no doubt from the combination of these causes, that although we know the exact period when one of the greatest men that Scotland, or even Europe, ever produced, left the stage of mortal existence, yet, with the exception of

* Woodhouse. *Treatise on Trigonometry*, p. 171.

† It was time to clear up this matter, for of late years the tables have been completely turned upon the Inventor of Logarithms. In the "Dictionary of General Knowledge, by George Crabb, A. M. 1830," I find Briggs thus recorded, "Briggs, an English arithmetician, the *Inventor of Logarithms!*" and in the same volume, "Napier, a Scotch arithmetician, *improved the system of Logarithms!!*" So the Library of Entertaining Knowledge says, that our philosopher signed himself "Peer of Merchiston;" and the Dictionary of General Knowledge says he was not the inventor of Logarithms.

what I am presently to communicate, there is no record, so far as I have been able to discover, of the place where he was buried. It is in the recollection of the older inhabitants of Edinburgh, that when the church of St Giles was skirted on the north side by a fringe of wooden erections occupied as shops, there was to be seen, on the front of the church, a stone in the wall, with this inscription:

S. E. P.
FAM. DE NEPERORVM INTERIVS
HIC SITUM EST.*

"From this it was evident that some of the family of Napier were interred in the church, and it was commonly believed that John Napier, the inventor of Logarithms, must have been one of them.

"In support of this opinion, Maitland, the author of the History of Edinburgh, has always been quoted. He says, 'The following inscription is fixed on the outside of the northern wall of the choir of the church of St Giles, in commemoration of the illustrious and ever memorable Lord Naper, Baron of Merchiston, inventor of the Logarithms, whose remains were interred in the choir of the church. Now, although no monument can add to the fame of this great man, he being most gratefully and honourably remembered in the works of the learned in all parts of Europe as the author of that most curious and useful art, I have nevertheless chosen to point out the place of his inhumation by the said humble inscription.' Another writer on the history of Edinburgh, Arnot, says, 'In different quarters of this church (St Giles) there are monuments of the celebrated Lord Napier of Merchiston.'

"I think it probable that Arnot followed Maitland in saying that the inventor of Logarithms was buried in St Giles'; and also that the late Earl of Buchan, who says the same thing in his Life of Napier, had no other authority. I have consulted the very ingenious John P. Wood, Esq. the editor of the second edition of Douglas's Peerage, who, in his additions to that work, agrees with these writers in saying that Napier was buried in St Giles'; but I find

* The attention and taste of Mr Burn, who renewed the church, have paid due honour to this old monument, which after undergoing various chances and changes, is now restored to its original position in a niche on the east side of the north door of the church. The arms above the inscription are the combined shields of Napier of Merchiston and Napier of Wrighthouses, but of what date I have not been able to determine. The families were connected by marriage in 1513, as I have elsewhere noticed, and may at that time have had a joint burial place at St Giles. The stone has every appearance of being much older than the time of the philosopher.—*Author.*

that he had followed the Earl of Buchan. On the whole, then, the popular opinion, which I found was also the belief of the present family of Napier when I first brought forward the question, has no other foundation than the assertion of Maitland; and his opinion seems to have been formed merely from the inscription on the stone, formerly on the front of the church, but taken down and placed in the inside by Mr R. Johnston, a zealous preserver of the antiquities of Edinburgh, at the time the Luckenbooths were demolished. It is now restored to its first position, and would certainly be contemplated with veneration if it could be proved to be the genuine monument of the celebrated Napier.

" I have good reason, however, to believe that the inventor of Logarithms was not buried in St Giles' church, but, on the contrary, that he was buried in the old church of St Cuthbert, which has been long demolished, and replaced by the present church on nearly the site of the former.

" My authority for this belief is unquestionable: It is a Treatise on Trigonometry, by a Scotsman, James Hume of Godscroft, Berwickshire, a place still in possession of the family of Hume. The work in question, which is rare, was printed at Paris, and has the date 1636 on the title-page; but the royal privilege, which secured it to the author, is dated in October 1635, and it may have been written several years earlier. In this treatise (page 116) Hume says speaking of Logarithms, ' *L'inuenteur estoit un Seigneur de grande condition, et duquel la posterité est aujourd'huy en possession de grandes dignitéz dans le royaume, qui estant sur l'age, et grandement trauaillé des gouttes* ne pouuait faire autre chose que de s'adonner aux sciences, et principalment aux mathematiques et à la logistique, à quoy il se plaisoit infiniment, et auec estrange peine, a construict ses Tables des Logarymes, imprimees à Edinbourg en l'an* 1614, *qui tout aussitost donnerent vn estonnement à tous les mathematiciens de l'Europe, et emporterét le Sieur Biggs (Briggs), professeur à Oxford, d'Angleterre en Escosse pour apprendre de lui cette admirable inuention de construire les Logarymes, et l'ayant enseigné à construire vne nouuelle espèce de Logaryme,† lui laissa ceste charge pour les faire apres sa mort, ce qu'il fit comme on le voujouit aujourd'huy par toutes les boutiques de libraires: Il mourut l'an* 1616, *et fut enterré hors la Porte Occidentale d'Edinbourg, dans l'Eglise de Sainct Cudbert.*'

* I have not found it elsewhere recorded that our philosopher suffered from gout.—*Author.*

† This is of more importance than the evidence of his burial-place; it shows that Briggs was not considered the inventor of the new system of Logarithms.—*Author.*

" Here we have a direct assertion that Napier was buried *without the West Port of Edinburgh, in the Church of St Cuthbert;* and this is made not more than eighteen years after his death, which happened 3d [4th] April 1617 (not 1616, as stated by Hume.) Besides, this circumstantial declaration is made by Napier's countryman and contemporary, perhaps his personal friend; * at any rate, by one who had good means of knowing the truth, and who seems to have taken a deep interest in Napier's invention, and in every thing connected with him.

" Further, I would add, that the probability of the thing gives a weight to Hume's testimony, which, however, it does not require; for Merchiston, the residence of Napier, was in the parish of St Cuthbert; and nothing is more reasonable than to suppose that he would be buried in his parish church." †

It is a mistake, though recorded by Dempster and Dr M'Crie, to suppose that Napier's mathematical pursuits led him to dissipate his means. No man attended more strictly and conscientiously to his worldly affairs and numerous family. From his will it appears that, besides his great estates, the personal property he left at his decease amounted to a large sum, and suffered little diminution from his debts, which were chiefly the current wages of his domestic and farm-servants. This interesting document has hitherto escaped the search of antiquaries, and it will gratify most readers to know its contents.

" THE WILL OF NAPIER OF MERCHISTON.

" The Testament Testamentar and Inventar of the guidis, geir, sowmes of money, and debtis pertening to umquhile, the rycht honorabill Jon Naipper of Merchinstoun, within the parochine of Sanctcuthbert and schirefdome of Edinburgh, the tyme of his deceis; quha deceist upon the fourt day of Appryle the yeir of God i^{m} vi^{c} and sevinteine yeiris, ‡ ffaithfullie maid and gevin up be Agnes Naipper, dochter lawfull to the defunct, only major for hir selff,

* His personal friend would not have referred Napier's mathematical studies to his old age, and being troubled with gout.—*Author.*

† On the Burial-Place of Napier of Merchiston, by William Wallace, A. M. F. R. S. E. &c. Professor of Mathematics in the University of Edinburgh. Read to the Society of Antiquaries of Scotland, 9th May 1832.

‡ Most writers record the date of Napier's death erroneously, some placing it in 1616, and others in 1618.

and gevin up be Annas Chisholme, his relict spous, tutrix testamentar to Alexander, Elizabeth, William, Heleine, and Adame Naipperis, minoris, bairnes lawfull to the defunct; Quhilkis Agnes, Alexander, Elizabeth, Williame, Heleine, and Adame Naipperis, ar onlie executeris testamentaris nominat be thair said umquhile father, in his latter will under-writtine, as the samyn of the dait at Edinburgh the first day of Appryle the yeir of God foirsaid, in presens of the nottaris and witnessis under writtine mair at lenth beiris.

" In the ffirst, the said umquhile Jon Naipper had the guidis, geir, sowmes of money, and debtis of the availl and prices efter following pertening to him the tyme of his deceis foirsaid, viz. pasturand upone the maines of Merchinstoun, xxvi auld oxin, by the airschip price of the peice oureheid, sexteine lib. *suma* iiij^{c} xvi^{lib}. Item, aucht werk hors, by the airschip hors price of the peice of foure thairof oureheid fourtie pundis, *suma* i^{c} lx^{lib}. Item, the uther of the hors thairof, price fourtie merkis. Item, the uther of the said hors, price thairof nyne pundis. Item, the uther two of the saidis aucht hors, price of the peice oureheid xxxv merkis, *suma* lxx merkis. Item, sawin upone the said maynes of Merchinstoun, fourtie foure bollis quheit estimat to the feird corne extending to aucht scoir sexteine bollis quheit, price of the boll with the fodder, aucht pundis, *suma* ane thousand iiij^{c} viij^{lib}. Item, mair sawin upone said maynes liij bollis iij firlatis aitis, estimat to the third corne, extending to aucht scoir, ane boll, ane firlot aitis, price of the boll, with the fodder, sevin merkis, *suma* vij^{c} lij^{lib}. x^{s}. Item, mair sawin upone the said maynes xliij bollis, half boll peis, estimat to the feir corne, extending to aucht scoir fourteine bollis peis, price of the boll with the fodder, fyve pundis, *suma* viij^{c} lxx^{lib}. Item, in the barnis and barneyaird of Merckinstoun nyne scoir bollis and sex peckis beir, price of the boll oureheid, with the fodder, vij^{lib}. *suma* ane thowsand twa hundreth lxij^{lib}. xij^{s}. vi^{d}. Item, mair thair xx bollis iij firlotis peis, price of the boll oureheid with the fodder, aucht merkis, *suma* i^{c} x^{lib}. xiij^{s}. iiij^{d}. Item, mair thair lvi bollis aits, price of the boll oureheid with the fodder, v^{lib}. *suma* ij^{c} lxxx^{lib}. Item, mair thair lxxxvi bollis v peckis quheit, price of the boll oureheid with the fodder, aucht pundis, *suma* vi^{c} lxxxx^{lib}. x^{s}. Item, in the girnell in the defunctis hous in Lennox, sex scoir bollis firme meill, at iiij^{lib}. the boll, *suma* iiij^{c} lxxx^{lib}. Item, in the girnell in Torrey in Monteith, lxxx bollis meill at iiij^{lib}. the boll, *suma* iij^{c} xx^{lib}. Ffollowis the silwer wark by the airship, viz. twa silwer peisis and ane goblit, weyand in the haill xx unce weycht, price of the unce weycht thrie pundis, *suma* lx^{lib}. Item, in utenceillis and domiceilis, with the abulzemen-

tis of his body, by the airschip, estimat to the sowme of iiij^{c} ^{lib}. Item, pasturand in Merchinstoun foure ky at xx merkis the peis, *suma* lxxx merkis. Item, pasturand in Monteith xi ky at xx merkis the peis, twa stotis, and twa quoyis of twa yeir auldis, at v^{lib}. the peice oureheid, *suma* i^{c} lxvi ^{lib}. xiij^{s}. iiij^{d}. Item, in the girnell of Bowquoppill, sexteine bollis ane firlot meill, at iiij^{lib}. the boll, *suma* lxv^{lib}.

" *Suma* of the inventar, vij^{m}. v^{c}. lxxvij^{lib}. xii^{s}. 6^{d}.

" Ffollowis the debtis awin to the dead.

[These details I omit, as they occupy eight folio pages, and are chiefly composed of the rents due by his tenants on his estates in Lothian, Lennox and Menteith.]

" *Suma* of the debtis awin to the dead, v^{m} ix^{c} lxxxxix^{lib}, i9^{s}, x^{d}.

" *Suma* of the inventar, with the debtis, xiij^{m}, v^{c}, lvij^{lib}, xij^{s}, 4^{d}. [L. 13557, 12s. 4d.]

" Ffollowis the debtis awin be the dead.

" Item, Thair wes awin be the said umquhile Johne Naipper to James Drysdaill, servand, for his yeiris fie and bounteth, fourtie pundis. Item, to Walter Monteith, greive, for his yeiris fie and bounteth, xxxi^{lib}. v^{s}. Item, to Williame Haghous, for his yeiris fie and bounteth, viij^{lib}. Item, to Jon Riddoch, for his yeiris fie and bounteth, sexteine pundis. Item, to Barbara Geddie, for hir yeiris fie and bounteth, xx^{lib}. Item, to Mareoun Finlaysone, for hir yeiris fie and bounteth, sex pundis. Item, to Jon M'ilholme, servand, for his yeiris fie, v^{lib}. Item, to Mr Henry Blyth, minister at Halirudhous, for the teind dewtie of the landis of Merchinstoune in anno 1617 yeiris, xiiij^{lib}. iij^{s}. Item, to the Principall and Regentis of the Colledge of Glasgow, for the teind dewtie of the landis of the cheines, resten in anno foirsaid, x merkis. Item, to the proveist, baillies, and counsell of the burghe of Edinburgh for the dewtie of ane uther pairt of the saidis landis, resten in anno foirsaid, ten merkis. Item, to Alex^{r} Monteith, servand to the defunct, for his yeiris fie and bounteth, ane hundreth pundis. Item, to his Majestie's thesaurer for the few-dewtie and mairt silwer of the landis of Bowquhoppill appertening to the defunct, resten in anno foirsaid, xliiij^{lib}. Item, mair to his Maiestie's thesaurer for the few-dewtie and mairsilwer of the landis of Torrie, resten in anno foirsaid, xiij^{lib}. Item, to Thomas Maissoun, hynd in Merchinstoun, for his hynd-boll thairof, resten in anno foirsaid, aucht bollis aitis at seven merkis the boll, and ane boll of peis, price fyve pundis, *suma* xlij^{lib}. vi^{s}. viij^{d}. Item, to Thomas Davie, hynd thair, for his hynd-boll, in anno foirsaid, aucht bollis aitis at seven

markis the boll, and ane boll peis, price v^{lib}. *suma* fourtie-twa pundis, six schillingis, aucht pennyis. Item, to Johne Flint, hynd thair, for his hynd-boll in anno foirsaid, aucht bollis aitis, at seven merkis the boll, and ane boll of peis, price fyve pundis, *suma* xlij^{lib}. vi^{s}. viij^{d}. Item, mair to the town of Edinburgh commontie thairof, for the few-dewtie of the landis of Over-Merchinstoun, resten in anno 1617, xx merkis.

" *Suma* of the debtis awin be the dead, iiij^{c} lj^{lib}. i^{s}. iiij^{d}.

" Restis of frie geir, the debtis deducit, xiij^{m} i^{c} vi^{lib}. xi^{s}. [L. 13106, 11s.]

" To be devydit in thrie pairtis, deadis pairt is iiij^{m} iij^{c} lxviij^{lib}. xvij^{s}. Quhairof the quot is componit for ij^{c} merkis.

" Ffollowis the deadis legacie and latter will.

" I, Johne Naipper of Merchinstoun, being sick in bodie at the plesour of God, bot haill in mynd and spereit, and knawing nathing mair certane nor death, and the tyme and manner thairof maist uncertane, and willing to dispose upon my wurldlie effairis, and to be dischairgit of the burding and cair thairof, sua that at the plesour of Almichtie God I may be reddie to abyd his guid will and plesour quhen it sall pleis him to call me out of this transitorie lyfe, I have nominat, maid, and constitute, and be the tenour heirof, nominatis, makis, and constitutis my weilbelovit bairnes lawfull, Agnes, Alex^{r}., Elizabeth, Williame, Heleine, and Adame Naipperis, my executouris and onlie intromettoris with my guidis, geir, and debtis, with power to thame and to Annas Chisholme, my loving spous, thair mother, in thair names, be reasone of thair minorities, to gif up inventar thairof, and I have maid and constitut, and be thir presentis, makis and constitutis the said Annas Chisholme, my spous, tutrix to my saidis haill bairnes, and administratrix to thame, thair rentis, guidis, and geir dureing hir wedowheid, and that the said Annas salbe comptabill of hir intromissioun to the saidis bairnes, my executouris foirsaid, at the sicht of Archbald Naipper, my eldest sone, and Jon Naipper and Mr Robert Naipperis, his brether, also my sones; and gif it sall happin hir to marie, I mak and constitute the said Mr Robert Naipper, oure sone, tutor to my saidis haill bairnes, and administrator to thame, thair rentis, guidis, and geir dureing thair minorities. Item, I leive to the saidis Agnes, Alex^{r}. Elizabeth, Williame, Heleine, and Adame Naipperis, my executouris foirsaidis, my pairt and third part callit the deidis pairt of my haill guidis, geir, and debtis quhatsomever, equallie amangis thame sex; and this to all and sindrie quhome it effeiris, I mak knawin be thir presentis, writtine be Jon Stewart, servitour to Adame Lawtie, writter in Edinburgh, and subscryvit with my hand at Edinburgh the first day of Appryle, the yeir of

God i^{m} vi^{c} and sevinteine yeiris, Before thir witnessis, James Maxwell, appeirand of Calderwood; Mr Williame Airthour, minister of the Evangell at the West Kirk of Edinburgh; Edward Mekilson, writter in Edinburgh, and Thomas Caldwell, servitor to the Laird of Dunrod, with utheris divers, viz. David Crichtoun, servitour to Mr Robert Watersone, insertor of the dait and witnessis heirof, and connotter heirto. *Sic subscribitur* Jon Naipper above-writtine, with my hand at the pen led be the nottaris under-writtine, at my command, in respect I dow not writ myself for my present infirmitie and seiknes."

This will was signed on the fourth day before his death, which must have overtaken him rapidly at the last, as in that very year he published his *Rabdologia*, and, subsequently, framed his trigonometrical rules, so distinguished in astronomy though he left them undigested. Henry Briggs, too, was on the eve of paying him a third visit. Of his last illness I have not been able to ascertain any farther particulars than that he had been for some time in a declining state of health, worn out, as we may gather from his own expressions already quoted, with constant and laborious studies. If the author of the old treatise on trigonometry can be relied upon, to this failure of his bodily strength was added the torture of the gout. But his latest mental effort proves that his mind was all powerful to the last. His character may be told in few words. No purer heart ever ceased to beat, no gentler spirit ever passed away, no finer intellect was ever extinguished, than when Napier of Merchiston died. His genius was in advance of his times, and isolated in his country. The departed light of Alexandria and the coming glory of England, seemed reflected upon him from the past and the future. He conquered where Archimedes failed; he entered the loftiest paths of Newton; and it shall be shown in the sequel, that if Napier's life had been spared some time longer, England's monarch of science might not have had so many laurels to reap. Yet is he scarcely remembered, for his genius reposes afar off, amid the wilderness of science, like a solitary lake unexplored by those who enjoy its waters in the valley.

> ——————— Is he resolved to dust,
> And have his country's marbles nought to say?
> Could not her quarries furnish forth one bust?
> Did he not to her breast his filial earth entrust?
> Ungrateful!

But the Canon Mirificus is his monument; and the following letter from a

philosopher, to whom we owe the first discovery of the great laws of the planetary system, is an inscription worthy of his tomb.

Kepler's Letter to Napier.*

" To the illustrious and noble John Neper, Baron of Merchiston, in Scotland, greeting,

" Some years ago, at the commencement of my Ephemerides, I began to afford my readers information respecting the state of the Rudolphine Tables, and to explain to them the causes of those delays which had frequently been the subject of their complaints to me by letters, public and private. Now, illustrious Baron, I accost yourself, apart indeed from all others,—as the subject, and your book, entitled *Mirificus Logarithmorum Canon* demands,—yet in this public manner, because my conference with you must interest all men of letters.

" That another year has been added to my delays is owing to the concurrence of peculiar circumstances in this year, besides the general causes which have hitherto impeded me. Some of these are of public notoriety, such as wars and comets,—others I have already spoken of, or alluded to in the preface to my Ephemerides for 1617 and 1619, which appeared in 1618; namely, the publication of five books of the *Harmonice Mundi*; which publication alone, not to mention the previous lucubrations, fully occupied me for a complete year. It is finished, however,—praise be to the Almighty Harmoniser of the Universe, despight the roaring, and raging, and at intervals, horridly blustering of Bellona, with her guns, and her trumpets, and her rattling drums. So

* Kepler was not aware of Napier's death two years after that event, which shows how retired was our philosopher's situation in reference to the world of letters. Lord Buchan says, " Kepler dedicated his Ephemerides to Napier, which were published in the year 1617." His Lordship had never seen the dedication, however, which is the above letter dated in 1619, prefixed to the Ephemeris for 1620. The work seems to be very rare. I have never been able to see a copy, but there is one in the Bodleian Library, Oxford; and my best thanks are due to Dr Bulkeley Bandinel for sending me from thence an accurate transcript of the letter. It would have been a valuable addition to Mr Drinkwater's Life of Kepler, but that gentleman had not been aware of it. Nor had either Montucla or Delambre seen it, as is obvious from their histories. The latter seems inclined to adopt the idea that Kepler, while so much engrossed with Logarithms, was not particularly anxious to acknowledge the author.—*See Astronomie Moderne*, Tome i. p. 507, &c. But the above completely exonerates Kepler from all paltry feeling on the subject. It also affords a most illustrious contradiction to the *inutile forsan adhuc et imperfectum jaceret opus* of Dr Barrow's oration. Never having previously met with a notice even of this interesting letter, I have given it entire in the Appendix, and translated the most popular passages above.

that had not this direful goddess beset me both at home and abroad, as yet she does, and had it not been for certain tricks of the trade (as happened to me in the second part of the *Epitome* or *Doctrina Theorica*, which has not been able to get through the press beyond the first page,) they who love to look deeply into the works of God's hands, illuminated by immortal mind, might, at this autumn fair of Frankfort, have had copies both of the Harmonics, and of my Description of Comets, which now for three months has been sticking at Auxburg.

" But the chief cause that impeded my progress this year in framing the Rudolphine Tables, was an entirely new but happy calamity which has befallen a part of the tables I long ago completed, namely, THAT BOOK OF THINE, illustrious Baron, which, published at Edinburgh, in Scotland, five years ago, I first saw at Prague, two years since. It was not then in my power to peruse it; but last year, having met with a little book by Benjamin Ursin, (long my familiar, and now astronomer to the Margrave,) where, in a few words, he gives the substance of your work extracted from the book itself, then I knew what had been done. Scarcely had I attempted a single example, WHEN, TO MY GREAT DELIGHT, I BECAME AWARE THAT YOU HAD GENERALISED THAT PLAY OF NUMBERS, OF WHICH A VERY SMALL PARTICLE HAD FOR MANY YEARS BEEN EMPLOYED BY MYSELF; and which I had proposed to incorporate with my tables; especially in the matter of parallaxes, and in the minutes of duration and delay in eclipses; of which method this very Ephemeris exhibits an example. I was aware, indeed, that this method of mine was only applicable in the solitary case of an arc differing in no sensible degree from a straight line. BUT OF THIS I WAS IGNORANT, THAT, FROM THE EXCESSES OF THE SECANTS, LOGARITHMS COULD BE CONSTRUCTED, WHICH MAKE THIS METHOD UNIVERSAL THROUGH ANY EXTENT OF ARC. Then I longed above every thing to know if in this little book of Ursin's the Logarithms had been accurately investigated. Calling to my aid, therefore, *Janus Gringalletus Sabaudus*, my familiar, I ordered him to subtract the thousandth part of the whole sine; again, to subtract the thousandth part of that residue, and to repeat this operation more than two thousand times, until there remained about the tenth part of the whole sine; but of the sine, from which a thousandth part had been subtracted, I computed the logarithm with the greatest care, beginning from the unit of that division which Pitiscus most frequently uses, namely, the duodecimal. The logarithm thus

computed, I arranged uniformly with the remainders of all the subtractions. In this manner I ascertained that there was no essential error in these logarithms; though some little errors had crept in, either of the press, or in that minute distribution of the greater logarithms about the beginning of the quadrant. I mention this to you by the way, in order that you may understand how gratifying it would be to me at least, (and I should think to others,) if you would put the world in possession of the methods by which you proceeded, of which I make no doubt you have many, and most ingenious, at your hand.

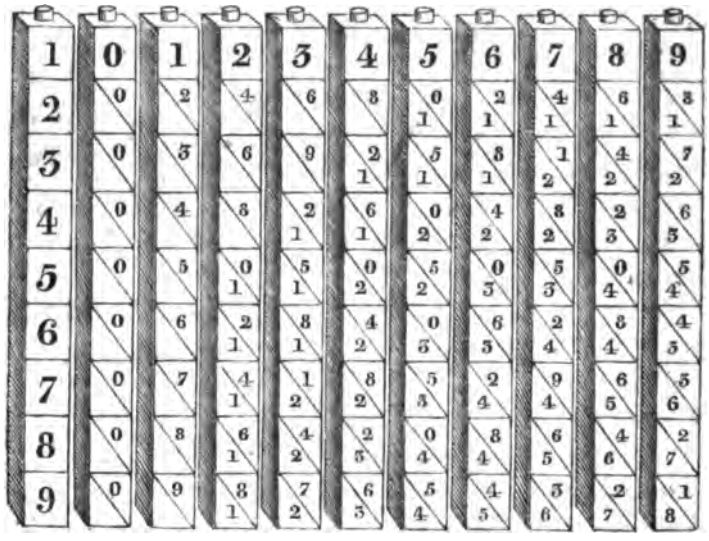
"Now, let us come a little closer to your tables," &c. &c.

"That none may doubt, upon this artifice I have framed the present Ephemeris, and therefore of right it is inscribed to you, illustrious Baron. Thus, of necessity, your Logarithms become a part of the Rudolphine Tables; being in the first place reprinted in my printing-office; and so astronomers shall have cause to congratulate themselves upon my delays. If any better plan suggest itself to you, pray communicate it to me as soon as possible; and this same request, which by private letters long ago I made to some professors of astronomy, I now publickly repeat to all of them. Farewell, Illustrious Baron, and, according to the sympathy of our common studies, receive this address from an inferior in rank, and one most observant of your high distinction.

"JOHN KEPPLER."

"AT LINTZ ON THE DANUBE,
28*th July* 1619."

" NEPER'S BONES."



HISTORY

OF THE

INVENTION OF LOGARITHMS, &c.

THE philosophy of Logarithms has been so thoroughly investigated by the many illustrious authors already referred to, that it is unnecessary to attach an algebraic discussion, or analytical theory of Napier's great invention, to his domestic memoirs. I shall attempt, however, to sketch the history of his mathematical studies, especially in reference to those points which appear to have been carelessly or inaccurately recorded. To this shall be added some very curious original matter from our philosopher's unpublished manuscripts, which cannot fail to interest even those who are deeply read in mathematics.

The most popular English history of Logarithms mixes up, in one theoretical view, the Logarithmic properties of numerical progressions, observed for many ages before Napier's time, with "the happy Invention of Logarithms." * But any observations of the kind made by calculators between the time of the sage of Syracuse, and the sage of Scotland, seem to resolve themselves into the celebrated theorem of the former, the history of which has been already given. † A more distinct arithmetical view, of the properties of that theorem, was of necessity obtained through the medium of Arabic or Indian notation, which Archimedes did not possess; but our own philosopher was not led to his invention or discovery by the preparatory labours of others, or at least that aid was afforded him as much by Archimedes as by any one else. This can be easily rendered obvious.

We shall suppose that a mere tyro in modern arithmetic, and one ignorant of geometry, endeavours to make himself master of the theorem in the *Arenarius*. In any geometrical progression from unity, represented by the letters,

A, B, C, D, E, F, G, H, I, K, L,

* Hutton.

† See page 346.

and of which A is unity, he finds from Archimedes, that, " if any two of the terms be multiplied together, the product will also be a term in the same progression; and its place will be at the same distance from the larger of the two *factors* that the lesser *factor* is from unity; and that its distance from unity will be the same, *minus one*, that the *sum* of the distances of the two *factors* from unity is distant from unity." To relieve his attention, our tyro will naturally substitute actual numbers in place of the symbols used by Archimedes. Having mastered the meaning of a *geometrical* progression, he may be supposed to adopt the series most easy to multiply into such a progression, namely,

1, 10, 100, 1000, 10000, 100000, 1000000, 10000000, &c.

where he obtains a proportional increase in the constant ratio of 10, simply by adding an additional cypher to each additional term. He may select the two nearest terms from unity to make his experiment, and will not be long in discovering, that 100 multiplied by 10, gives 1000, the fourth term in the progression, counting unity. His eye will tell him at once that 1000 is at the same distance from the larger *factor* 100, that 10, the lesser *factor*, is from unity. Nor will he have much greater difficulty in ascertaining that the united numbers of the places of the *factors*, counting unity, is equal to 5, and that the product sought is at that number, *minus one*, being the *fourth* term.

So far the theorem is satisfactorily tested. But if the tyro, in repeating his attempts, should select terms at a greater distance from unity and each other, his eye will not so readily assist him to the fact of the respective distances. He would have to count the terms, which might naturally lead him to number them, thus:

1 2 3 4 5 6 7 8

1, 10, 100, 1000, 10000, 100000, 1000000, 10000000.

In this manner, he would soon arrive at the knowledge, that the mere addition of the two upper figures immediately above the two lower terms to be multiplied, will give a sum or figure in the upper line, pointing not to the actual product sought, but to the term immediately beyond it; and he would also easily detect, that the fact of its not pointing immediately to the product, was explained by the *minus one*, which forms a hitch, as it were, in the theorem of Archimedes. Now, supposing the tyro to possess some ingenuity, he will easily get rid of this inconvenience by numbering the distances in the geometrical series differently, and calling 10 not the second term in the series, but the first term after unity, or the first distance from unity; and this would seem the more accurate way of numbering, for 1 cannot be said to be at any distance from itself. He would then arrange them thus:

1 2 3 4 5 6 7

1, 10, 100, 1000, 10000, 100000, 1000000, 10000000.

According to this mode of numbering, he would find that the *sum* of any two figures in the upper line was a number in that same line *directly* over a term in the lower line, which would be the *product* of the two terms respectively below the added figures. After this step it would not be difficult, even for a tyro, to detect all the simpler operations with

the upper progression, affording the same results as the more complicated operations with the lower.

In the case supposed, a rude and limited, and, we may add, useless table of Logarithms, is unconsciously formed; the numbers composing the arithmetical series being truly Logarithms to the terms composing the geometrical. But no step of any value beyond what was demonstrated by Archimedes is thus accomplished. The theorem of the school of Alexandria has been viewed through the facilities of Arabic notation,—a logarithmic adaptation of numerical progressions has been very clearly brought out,—but *the Logarithms* are just as far as ever from being discovered. Yet the very arrangement and base of the common Logarithms is thus exemplified by a tyro's translation of Archimedes's theorem into Arabic numerals!

The fact is, that our system of notation is essentially Logarithmic; and the tyro might have even detected, in the simple algorithm, 1000, the very process he had gone through in testing the theorem of Archimedes. 1000 expresses that 1 has progressed three steps from right to left; the cyphers mark those steps, and therefore may be said to number them. Then the Arabic system is in a decuple progression; *i. e.* each move of the advancing digit increases its value ten times its last value; so 1000 is unit progressed from right to left in this order, 1000, 100, 10, 1. The values of each move are here noted; and the steps themselves may be arranged and numbered, thus:

1 2 3

1, 10, 100, 1000.

Here we are back again to the Archimedean theorem and Logarithms! It will be observed, that to number the last example is superfluous, for the *cyphers* perform that office. Again, it is equally superfluous to write the whole steps of the progression at full length, for the simple notation 1000 expresses all the steps. It is a short-hand *exemplification* of the most convenient system of Logarithms; the cyphers stand in place of the *arithmetical* progression, 1, 2, 3, &c. as adapted to the *geometrical* progression, 1, 10, 100, 1000, &c. and the whole is based upon the denary scale in use. But if this be true, it must follow that the mere *addition* of the cyphers in the Arabic scale will afford the same result as the *multiplication* of the terms? And such, indeed, is the case; for a thousand multiplied by ten thousand gives ten million: ten million is noted by unit moved to the left seven steps, *i. e.* unit with seven cyphers to the right. A thousand has three cyphers, and ten thousand has four, which added, give seven. Write this out, and we have

1000
10000
10000000

1 2 3 4 5 6 7

1, 10, 100, 1000, 10000, 100000, 1000000, 10000000.

Now, 1000 multiplied by 10000 must give 10000000; for the numbers above the *factors* are 3 and 4, which added, give 7, which number points to the product sought, 10000000.

Thus we find that the Arabic system itself is essentially Logarithmic, and that the properties of the Archimedean theorem may present themselves to a very ordinary cal-

culator, upon a consideration of the simple notation 1000. I am not aware that the most profound observers of numerical progressions before the time of Napier ever went a single step beyond what we have thus exemplified. They pointed out the effect of the adaptation of an arithmetical to a geometrical series of numbers in relieving the calculation of the terms of the latter series *in a particular case*. They might vary the case by choosing other ratios of progression, and examine their properties more minutely, but none of them (supposing them as numerous as Dr Hutton assumes) ever conceived the possibility of making the principle embrace the WHOLE SYSTEM OF NUMBERS. That was "the reason why tables of such artificial numbers were not sooner formed," and by no means because they were not sooner wanted.

If all numerical operations were performed upon the decuple progression itself, and by means of unit and cyphers, calculators would have an easy time of it, and children might lisp in Logarithms. But where is the advantage of knowing, that to multiply 10000 by 1000 we need only add the cyphers, when we have, for instance, to multiply 4723 by 835? It takes some trouble to discover that the product of those factors is 3943705, a number very little indebted to cyphers for its notation, and which is not to be obtained by reckoning and adding the steps of the factors' digits. In other words, it required no great penetration to discover that this progression, 1, 10, 100, 1000, &c. or this, 1, 2, 4, 8, 16, &c. can have for their logarithms the whole range of natural numbers 1, 2, 3, 4, &c.; but where are the logarithms for the many terms betwixt 1 and 10, 10 and 100, 100 and 1000, &c. or betwixt all the terms of any other geometrical progression? Kepler, in one of his enthusiastic essays on the subject, written not long after Napier's death, exclaims with testy irony against some jealous carping philosophers in Germany:—"Now what is this thing? Of what use are Logarithms? Why to be sure, of the very use that was declared ten years ago by the original inventor, Napier, and which may be conceived in three words. Wherever it happens in common arithmetic, and in the rule of three, that two numbers have to be multiplied together, in that case their Logarithms are to be added; where a number has to divide another, the Logarithm is only to be subtracted from the sum of the Logarithms, so that in the one case the added, and in the other case the remaining Logarithm points out the number sought in either operation. This, I say, is the use of Logarithms. But the featherless chickens of arithmeticians, greedy of facilities, and gaping with their beaks wide open at the mention of this use, as if to gorge every particular gobbet of my precepticles, were not to be satisfied in a work devoted to the fundamental demonstration of the Logarithms." * The use thus characteristically announced by Kepler would have been far beneath the observation of that lofty philosopher, but for its application to the whole system of natural numbers, from unity *in infinitum;* and Kepler himself, in his letter to Napier, draws the mighty distinction which separates the Scotch philosopher from every calculator in the world who had previously considered numerical progressions, when he

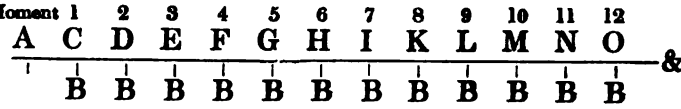
* *Joannis Kepleri, Supplementum Chiliadis Logarithmorum.* 1625.

says, "*Vix autem uno tentato exemplo, deprehendi, magna gratulatione, generale factum* abs te *exercitium illud numerorum, cujus* ego *particulam exiguam jam a multis annis in usu habebam.*"

We may well believe, that if Kepler, as he tells us himself, did actually observe, and attempt to reduce to practice, logarithmic properties of numbers, without having the least conception of the Logarithms *par excellence*, and also that Stifellius, a most profound arithmetician, examined such properties still more minutely without forming that conception, there was a gulf which totally disunited those speculations from Napier's invention, however Dr Hutton may have been pleased to jumble the ideas together in his history. The fact is, that, from the undeveloped state of the power of Arabic notation at this early period of European science, the speculations referred to had an obvious tendency to check the conception of the Logarithms. The natural system of numbers, 1, 2, 3, 4, &c. composed an arithmetical progression, capable of being Logarithms to various sets of geometrical progressions. How, then, could that system obtain Logarithms adapted to itself throughout its infinite extent? Its nature would require to be changed from an *arithmetical* to a *geometrical* series, without losing any of its terms; and this involved a contradiction, and was clearly impossible! The system of Logarithms is founded upon the correspondence of those different progressions. That system cannot exist as such, unless it be made applicable to the whole range of natural numbers. The whole range of natural numbers are in arithmetical progression, and never can form a geometrical one. How are these facts to be reconciled? Here all the calculators in Europe stopt short except Napier. His mind, of an uncommon cast, enabled him to break in upon this enchanted circle of numbers with perfect success. The general conception he formed was that of two *flowing points*, generating magnitudes by infinitely small degrees, and so regulated in their respective motions, that in the one case, the successive increments would be equal to each other; and in the other case, would differ proportionally from each other in an infinitely small degree. In the latter case, a geometrical progression was conceived, into which, obviously, all the natural numbers 1, 2, 3, 4, &c. might be supposed to enter as terms, having the magnitudes generated in the former case for their arithmeticals. Napier knew, indeed, that the infinitely small ratios which he imagined to be generated betwixt the natural numbers, were an approximation merely, and never could equal the determined finite quantity; but he had the sagacity to perceive, that, in such an approximation, the difference or defect would become smaller than any assignable quantity, and therefore would not sensibly affect the calculations to which he meant the system to apply. The two first chapters of the Canon Mirificus contain the developement of this beautiful idea, and no succeeding philosopher, though the most illustrious have tried it, has ever afforded a clearer view of Napier's method than his own statement, which is as follows:—

"Chap. I.—Of the Definitions.

1. Definition. "*A line is said to increase equally, when the point, describing the same, goeth forward equal spaces in equal times or moments.*

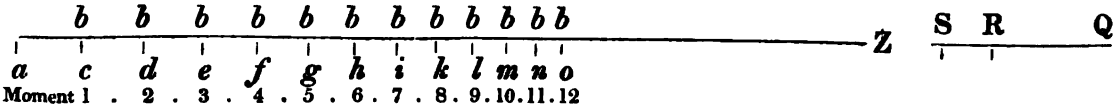


Let A be a point, from which a line is to be drawn by the motion of another point, which let be B. Now, in the first moment, let B move from A to C. In the second moment from C to D. In the third moment from D to E, and so forth infinitely, describing the line A C D E F, &c. The spaces AC, CD, DE, EF, &c. and all the rest being equal, and described in equal moments or times, this line by the former definition shall be said to increase equally.

A corollary or consequent. "*Therefore by this increasing, quantities equally differing must needs be produced in times equally differing.*

"As in the figure before, B went forward from A to C in one moment, and from A to E in three moments, so in six moments from A to H, and in eight moments from A to K; and the differences of those moments, one and three, and of these six and eight are equal; that is to say, two. So also of those quantities AC, and AE, and of these AH and AK, the differences CE, and HK are equal, and therefore differing equally as before.

2. Definition. "*A line is said to decrease proportionally into a shorter, when the point, describing the same in equal times, cutteth off parts continually of the same proportion to the lines from which they are cut off.*



"For example's sake. Let the line of the whole sine *a* Z be to be diminished proportionally. Let the point diminishing the same by this motion be *b*; and let the proportion of each part to the line from which it is cut off be as QR to QS. Therefore, in what proportion QS is cut in R, in the same proportion (by the 10 of the 6 of Euclid,) let *a* Z be cut in *c*; and so let *b*, running from *a* to *e* in the first moment, cut off *a c* from *a* Z, the line or sine *c* Z remaining. And from this *c* Z let *b*, proceeding in the second moment, cut off the like segment or part, as QR to QS, and let that be *c d*, leaving the sine *d* Z. From which, therefore, in the third moment, let *b* in like manner cut off the segment *d e*, the sine *e* Z being left behind. From which, likewise, in the fourth moment, by the motion of *b*, let the segment *e f* be cut off, leaving the sine *f* Z. From this *f* Z, in the fifth moment, let *b* in the same proportion cut off the segment *f g*, leaving the sine *g* Z, and so forth infinitely. I say, therefore, out of the former definition, that here the line of the whole sine *a* Z doth proportionally decrease into the sine *g* Z, or into any other last sine in which *b* stayeth, and so in others.

" *Hence it followeth, that, by this decrease in equal moments or times, there must needs also be left proportional lines of the same proportion, &c.* A corollary.

" *Surd quantities, or inexplicable by number, are said to be defined or expressed by numbers very near, when they are defined or expressed by great numbers which differ not so much as one unit from the true value of the surd quantities.* 3. Definition.

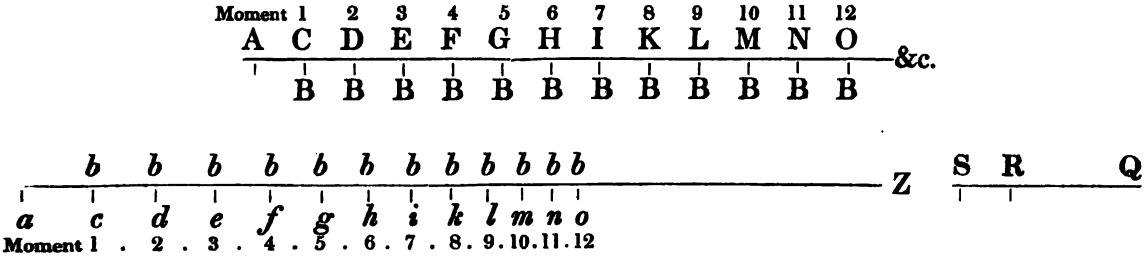
" As for example. Let the semidiameter, or whole sine, be the rational number 10000000; the sine of 45 degrees shall be the square root of 50,000,000,000,000, which is surd, or irrational and inexplicable by any number; and is included between the limits of 7071067 the less, and 7071068 the greater; therefore it differeth not a unit from either of these. Therefore that surd sine of 45 degrees is said to be defined and expressed very near, when it is expressed by the whole numbers 7071067, or 7071068, not regarding the fractions. For in great numbers there ariseth no sensible error by neglecting the fragments or parts of an unit.

" *Equal-timed motions are those which are made together, and in the same time.* 4. Definition.

" As in the figures following, admit that B be moved from A to C in the same time wherein *b* is moved from *a* to *c*; the right lines A C and *a c* shall be said to be described with an equal-timed motion.

" *Seeing that there may be a slower and a swifter motion given than any motion, it shall necessarily follow that there may be a motion given of equal swiftness to any motion, which we define to be neither swifter nor slower.* 5. Definition.

" *The* Logarithm, *therefore, of any sine is a number very nearly expressing the line which increased* equally *in the meantime, while the line of the whole sine decreased* proportionally *into that sine, both motions being equal-timed, and the beginning equally swift.* 6. Definition.



" As for example. Let the two figures going before be here repeated, and let B be moved always and everywhere with equal or the same swiftness wherewith *b* began to be moved in the beginning when it was in *a*. Then in the first moment let B proceed from A to C, and in the same time let *b* move proportionally from *a* to *c*, the number defining or expressing A C shall be the *logarithm* of the line, or sine, *c* Z. Then in the second moment let B be moved forward from C to D, and in the same moment or time let *b* be moved forward proportionally from *c* to *d*, the number defining A D shall be the *logarithm* of the sine *d* Z. So in the third moment, &c. and so forth infinitely.

A consequent.

" *Therefore, the logarithm of the whole sine* 10000000 *is nothing, or* 0; *and, consequently, the logarithms of numbers greater than the whole sine are less than nothing.*

" For seeing it is manifest by the definition that, the sines decreasing from the whole sine, the *logarithms* increase from nothing; therefore, contrariwise, the numbers which yet we call sines, increasing unto the whole sine, that is 10000000, the *logarithms* must needs decrease to 0, or nothing; and, by consequent, the *logarithms* of numbers increasing above the whole sine 10000000, which we call *secants* or *tangents*, and no more *sines*, shall be less than nothing.

" *Therefore we call the logarithms of the sines* abounding, *because they are always greater than nothing, and set this mark* + *before them, or else none. But the logarithms which are less than nothing we call* defective, or wanting, *setting this mark* — *before them.*

" It was, indeed, left at liberty in the beginning to attribute nothing, or 0, to any sine or quantity for his logarithm; but it was best to fit it to the whole sine, that the addition or subtraction of that logarithm which is most frequent in all calculations might never after be any trouble to us.

Chap. II.—Of the Propositions of Logarithms.

1. Proposition.

" *The logarithms of proportional numbers and quantities are equally differing.*

" As for example. The logarithms of the proportional sines, namely *c* Z, which is to *e* Z as *h* Z is to *k* Z, are respectively the numbers defining AC, AE, AH, AK, as is manifest by the 6th definition. Now AC and AE differ by the difference CE, and AH and AK by the difference HK. But, by the first definition and his corollary, CE and HK are equal; therefore the *logarithms* of the foresaid proportional sines are equally differing. And so in all proportionals," &c.

2. Proposition.

" *Of the logarithms of three proportionals, the double of the second or mean, made less by the first, is equal to the third.*

" Seeing that by the first proposition the difference of the *logarithm* of the first and second is equal to the difference of the *logarithms* of the second and third, that is, the second made less by the first is equal to the third made less by the second; therefore, the second being added to both sides of the equation twice, the second, or the double of the second made less by the first, shall come forth equal to the third, which was to be proved.

3. Proposition.

" *Of the logarithms of three proportionals, the double of the second, or middle one, is equal to the sum of the extremes.*

" By the second proposition, the double of the second, made less by the first, is equal to the third. To both the equal sides add the first, and there shall arise the double of the second, equal to the first and third, that is, to the sum of the extremes; which was to be demonstrated.

4. Proposition.

" *Of the logarithms of four proportionals, the sum of the second and third, made less by the first, is equal to the fourth.*

" Seeing by the first proposition of the logarithms of four proportionals the second

made less by the first, is equal to the fourth less by the third; add the third to both sides of the equality, and the second and the third made less by the first shall be equal to the fourth, which was propounded.

5. Proposition.

" *Of the logarithms of four proportionals, the sum of the middle ones, that is, of the second and third, is equal to the logarithm of the extremes, that is to say, the first and fourth.*

" By the fourth proposition, the second and third made less by the first were equal to the fourth: to both sides of the equality add the first, and the second more by the third shall be made equal to the fourth more by the first, which was to be demonstrated.

6. Proposition.

" *Of the logarithms of four continual proportionals, the triple of either of the middle ones is equal to the sum of the further extreme, and the double of the nearer.*

" By the second proposition, the double of the second made less by the first is equal to the third; and by the third proposition the double of this, that is, the fourfold of the second, made less by the double of the first, shall be equal to the sum of his extremes, that is, the fourth more by the second. Now if from both sides of the equality you subtract the second, the triple of the second made less by the double of the first shall be made equal to the fourth. Again, to the sides of this equality add the double of the first, and there shall arise the triple of the second, equal to the fourth, more by the double of the first, which we undertook to prove.

An Admonition.

" Hitherto we have shewed the making and symptoms of Logarithms. Now by what kind of account or method of calculating they may be had, it should be here shewed. But because we do here set down the whole tables, and all his Logarithms with their sines to every minute of the quadrant, therefore passing over the doctrine of making Logarithms till a fitter time, we make haste to the use of them; that the use and profit being first conceived, the rest may please the more being set forth hereafter, or else displease the less, being buried in silence. For I expect the judgment and censure of learned men hereupon, before the rest, rashly published, be exposed to the detraction of the envious." *

The abstract geometrical mode in which Napier promulgated his system was so perfectly original, as to startle and disturb some of the High Priests of Science in Germany; and although that promulgation was accompanied by a canon, which (to use Dr Hutton's expressions) "is a perfect work on this kind of Logarithms, containing in effect the Logarithms of all numbers, and the logarithmic sines, tangents, and secants, for every minute of the quadrant, together with the description and uses of the tables," still some of the venerable sages of the 16th century, no less jealous than astonished, shook their gray heads at the auspicious dawn of the 17th, and refused the summons of Kepler to fall down and worship the greatest era of science, as its sun first rose above the remote hills of unlettered Scotland. " When," says Kepler, " in the year 1621, I travelled into Upper Germany, and discoursed every where with those skilled in the mathematical sciences,

* English translation of the Canon Mirificus. 1616.

concerning the Logarithms of Napier, I discovered that they, of whose minds age had diminished the activity, in proportion as it had increased the experience, were unwilling to admit this description of numbers in place of the usual canon of sines. They said it was degrading to a professor of mathematics to show such childish exultation about any compendious method of numbers; and meanwhile to receive into practice, without even a legitimate demonstration, a form of calculus, which some day or other might betray into errors when least suspected. They complained that Napier's demonstration depended upon the fiction of a peculiar geometrical motion, whose slippery and unstable nature was inadequate to sustain the severe march of reason and demonstration. This (he adds) induced me to attempt to found a legitimate demonstration, not under the nature of lines, or motion and fluxion, or, so to speak, any other sensible quantity, but under that of ratios and abstract quantities," &c. But even Kepler was wrong in this concession, as is admitted in modern science; and the puerility of the objection urged by these venerable bigots might have been retorted by the exulting champion of Logarithms. "Napier's view of the subject (says Professor Playfair) is as simple and profound as any which after two hundred years has yet presented itself to mathematicians. The mode of deducing the results has been simplified; but it can hardly be said that the principle has been more clearly developed." The opinion of the Newtonian age has in like manner been passed upon those commentaries of Kepler, in which he attempted a new demonstration of the Logarithms, and the judgment is, that even he only mystified the system of Napier, while professing to clear it, and at the same time drew his own purest principles from Napier's code. "Whether (says Delambre) these objections were suggested to Kepler or occurred to his own mind, they might have been easily answered. It is true that the consideration of fluents, and fluxions of lines and points in motion, are quite extraneous to the subject; but efface them all, and Napier's calculations are not a whit the less substantial. From two numbers which are in a given proportion, subtract proportional numbers, and the remainder will be proportional. Subtract from 9 and 10, a tenth part of each, there remains 8.1 and 9, and you have $10 : 9 :: 9 : 8.1$, $9 \times 9 = 10 \times 8.1 = 81$. Behold the fundamental theorem of Napier: upon this principle he formed his preparatory tables. Extend these tables sufficiently, and you will there find numbers sensibly equal to all the natural numbers, to the sines, and to every possible numerical quantity. The process is only an approximation. Napier admitted the fact: but where the limit of the error is known, it is always permitted to disregard it: equally admissible is it to adopt a method so eminently commodious: there is nothing puerile in adopting it with exultation: on the contrary, the desire to confine that conception to lines and hyperbolic spaces has something in it of pedantry. All the clearness, simplicity, and generality observable in the theory of Logarithms are the results of processes purely analytical or numerical; and we owe whatever is obscure to extraneous considerations with which the system has been painfully alloyed. I would wish no better proof of the fact than the works of Kepler and Mercator. Who would dream now a days of studying in Euclid the theory of numbers and proportions? These subtleties are more troublesome than useful, and time, which might be more profitably

and judiciously bestowed, is lost in demonstrating such conceptions." Delambre farther remarks of the *Chilias Logarithmorum;* "Kepler lays down 30 propositions; the most part of them appear fit for nothing but to swell the volume; the number was necessary, however, in order to justify a kind of *jeu de mots* in his dedication. The landgrave of Hesse, Philippe, had presented him with 30 pieces of silver, and he evinced his gratitude by dedicating a book to the landgrave containing 30 propositions. The dedication is in Latin verse garnished with Greek words. The book and the dedication are in the taste of the times. Kepler then proceeds to construct his tables, but takes very good care not to employ his 30 propositions; *in fact, he uses no theorem for which he is not indebted to Napier.*" * Such is the opinion of a philosopher, the hero of whose history of science is, nevertheless, Kepler.

But the most illustrious defence of Napier's genesis of Logarithms is to be found in the Life of Sir Isaac Newton. "The notion of flowing quantities *first proposed* by Newton, (says Professor Leslie as if in a day dream,) and from which he framed the terms fluxions and fluents, appears on the whole very clear and satisfactory; nor should the metaphysical objection of introducing ideas of motion into geometry have much weight. Maclaurin was induced, however, by such cavilling, to devote half a volume to an able but superfluous discussion of the question." † Yet the works either of Napier, Kepler, Delambre or Maclaurin might have informed our professor that, whatever its merits or demerits, the notion of flowing quantities was also Napier's, and that the terms said to have been framed by Newton are to be found in the Canon Mirificus. "*Sit punctus A, à quo ducenda sit linea* fluxu *alterius puncti, qui sit B*; fluat, *ergo primo momento*," &c. ‡ and from Kepler we learn that the same cavils against which Maclaurin philosophised had been urged against Napier. Maclaurin himself, in the very work referred to by Sir John Leslie, has a chapter "of Logarithms and the Fluxions of logarithmic quantities," in which he observes, "the nature and genesis of Logarithms is proposed by the inventor in a method similar to that which is applied in this doctrine (Fluxions) for explaining the genesis of quantities of all sorts, and is described by him *almost in the same terms.*" § We must now turn to the passage in Sir Isaac Newton's work, where he announces the method that led him to his great discovery.

"I consider mathematical quantities in this place not as consisting of very small parts, but as described by a continued motion. Lines are described, and therefore generated not by the opposition of parts, but by the continued motion of points; superficies by the motion of lines; solids by the motion of superficies; angles by the rotation of the sides; portions of time by a continual flux; and so in other quantities. These genesis really take place in the nature of things, and are daily seen in the motion of bodies. And after this manner the ancients, by drawing moveable right lines along immoveable right lines,

* Histoire de l'Astronomie Moderne, p. 507 *et infra.*

† Leslie's continuation of Playfair's Dissertation.

‡ *Canon Mirificus.*

§ Maclaurin's Treatise of Fluxions, Vol. i. p. 158.

taught the genesis of rectangles. Therefore, considering that quantities, which increase in equal times, and by increasing are generated, become greater or less according to the greater or less velocity with which they increase and are generated, I sought a method of determining quantities from the velocities of the motions or increments with which they are generated; and calling these velocities of the motions or increments *Fluxions*, and the generated quantities *Fluents*, I fell by degrees upon the method of Fluxions, which I have made use of here in the quadrature of curves, in the years 1665 and 1666." *

Here Newton seems to have fallen insensibly upon the method of Napier, for I can discover no indications in all his works that he had ever seen the Canon Mirificus, however deeply he entered the theory which that canon created. But the minds of these great men were formed in the same mould, although belonging to very different ages. Constantly bent on conquering where the difficulty seemed greatest, whether it were the mysteries of prophecy or calculation, they attacked their subjects with the same weapons. Had Newton been placed in the situation of Napier, he would have attempted the Apocalypse, and invented the Logarithms. Had Napier possessed the algebraic calculus in the state that Newton took it up from the hands of Girard, Harriot, Cavalerius, Descartes, Roberval, and Wallis, he would have reached the discovery of Fluxions by the very path of Newton; for, as it was, we shall find that he was on the confines of the binomial theorem. But some of the mathematical magnates of the present century, while reviewing the Fluxions of Newton, and the method which led him to attach that nomenclature to his system, make no mention of Napier, † as if there was nothing interesting or worthy of attention in the coincidence. Yet so strong is it, that, when the personal friend of Newton, and the greatest mathematician after Napier that Scotland ever produced,‡ set his powerful mind to expound the philosophy of Newton's fluxionary method, he wrote a chapter " of the grounds of this method," which serves equally well to illustrate Napier's Logarithms or Newton's Fluxions. Nay, he adopts the very propositions, and nearly the language of Napier. Even Dr Hutton, who has shown himself no friend to our philosopher's fame, observes, " Napier's manner of conceiving the ge-

* Sir Isaac Newton's Treatise of the Quadrature of Curves, &c. translated by John Stewart, A. M. Professor of Mathematics in the Marischal College, Aberdeen, 1745.

† No one should review, even by the slightest sketch, the mathematical sciences, without naming Napier,—far less if that review be in a life of Newton, who was so deeply indebted to the Logarithms. But the remarkable coincidences of the theological studies, and geometrical modes of investigation pursued by these philosophers, render it doubly strange that Sir David Brewster does not once mention Napier in his Life of Newton. How striking, on the other hand, are the observations of Delambre in his History of Astronomy. " *Néper démontre que* log sin A $>$ (1 — sin A) et $<$ (cosec A — 1). *Il le prouve par ses* Fluxions *et ses* Fluentes." Again, " *Képler promet une* démonstration légitime; *il regarde donc comme insuffisante ou inexacte celle de Néper: il pouvait lui reprocher des longueurs, des inutilités; il lui reproche, en effet, cette idée de* fluxions, *et de* fluentes, *qu'on a depuis reprochée à* Newton. *Mais nous verrons que les principaux théorèms trouvés et démontrés par Néper, n'ont pas été inutiles à la nouvelle demonstration.*"—Tome i. pp. 499, 507.

‡ Colin Maclaurin.

neration of the lines of the natural numbers and their Logarithms by the motion of points, is very similar to the manner in which Newton afterwards considered the generation of magnitudes in his doctrine of fluxions; and it is also remarkable, that in Art. 2 of the *Habitudines Logarithmorum et suorum naturalium numerorum invicem*, in the Appendix to the *Constructio Logarithmorum*, Napier speaks of the velocities of the increments or decrements of the Logarithms in the same way as Newton does, namely, of his fluxions, where he shows that those velocities, or fluxions, are inversely as the sines or natural numbers of the Logarithms, which is a necessary consequence of the nature of the generation," &c. And Hutton mentions this more particularly afterwards, when he says, " I shall here set down one more of these relations, as the manner in which it is expressed (by Napier) is *exactly similar* to that of fluxions and fluents, and it is this: Of any two numbers ' as the greater is to the less, so is the velocity of the increment or decrement *(incrementi autdecrementi)* of the Logarithms at the less, to the velocity of the increment or decrement of the Logarithms at the greater,' that is, in our modern notation, as $X : Y :: \dot{y}$ to $\dot{x}$, where $\dot{x}$ and $\dot{y}$ are the fluxions of the Logarithms of X and Y." *

We thus see that Napier's method was not an accidental idea, indicative of a rude age and country, but one which the loftiest minds were the most apt to adopt. Logarithms mark one great revolution in modern calculation,—Fluxions another; and surely the coincidence is not uninteresting that their immortal authors arrived at these discoveries independently of each other, but by a train of thought identically the same. But Newton, to use the expression of his latest biographer, was " the leader of a mighty phalanx, —the director of combined genius,—the general who won the victory, and therefore wears the laurels." Napier occupies a remote and solitary orbit, whose glory is all his own. He attacked science precisely at the point where the adventure was most uninviting and most laborious; and he did so precisely at the time when the achievement was of the greatest consequence. Men thought that the utmost power of the Indian algorithm was already displayed in the ascending decuple scale; and although some faint idea of Decimal fractions had been obtained, still, until Napier arose, the system of numbers was viewed falsely and in fragments, like the first appearances of the ring of Saturn through the rude telescope of Galileo. The Brahmins themselves never knew the value of the scale whose beautiful notation they transmitted to Europe. Wallis, the successor of Henry Briggs in the Savilian chair, and whose *Arithmetic of Infinites* gave the first impulse to Newton's mind, observes, " there are two very considerable improvements which we have added to the algorism of the Arabs since we received it from them, to wit, *Decimal fractions* and the *Logarithms*." Keill, who succeeded Wallis as Savilian professor, and is distinguished as the opponent of Leibnitz, has also remarked, " The mathematicks formerly received considerable advantages, first by the introduction of the Indian characters, and afterwards by the invention of Decimal fractions; yet it has since reaped at least as much from the invention of Logarithms as from both the other two." In short, there is no doubt that the great frame-work upon which the miraculous powers of modern calcula-

* Hutton's History of Napier's Construction of Logarithms, pp. 42, 48.

tion are reared, consists of three steps, the Arabic numerals, Decimal fractions, and the Logarithms. Now of these, Napier brought the second into operation, and created the last, at a time when other philosophers were engrossed with the fascinations of applicate science, and when physical research was soaring upon unruly wiug in dangerous advance of the science of numbers. This view of our philosopher's fame deserves a closer consideration; and we must now glance at the circumstances under which he deliberately undertook to unfold the latent power of the Arabic, or rather Indian, system.

We have reviewed, generally, in the preceding memoirs, the manner in which his great contemporaries of the continent were employed, and the resources they had obtained from their predecessors. The *desideratum* of those times was a philosopher of the intellectual order of Tycho, Kepler, or Galileo, who, possessing also their ardour for the advancement of science, would devote his whole power to conquer the tyranny of Logistic. One or two had made that attempt before Napier's time; and although the fruits of their labours conferred honour even upon Germany, still the results prove that his success was beyond the grasp of their minds. Had our philosopher lived under those cloudless skies where the telescope was first applied; had his lot been cast in some of those countries where the sons of science excited each other in the opening path of physical research; and where, (to use the expressions which, in reference to those countries, Napier addressed to his own monarch,) royalty itself became "the patron and protector of all zealous students, and an allower and acceptor of their godly exercises;" he, too, might have exerted his powers of calculation in legislating for the stars, or in founding some department of science less abstract and retiring than the path he followed. As it was, however, he turned to the numeral system, where there was so much to do, and where he achieved all that remained to be developed. That he set himself deliberately to the task, we learn from his own accounts, both in the preface to the Canon Mirificus, and in his letter to the Chancellor, already quoted; and the same is repeated in his preface to the *Arithmetica Localis*, where he says, "In the progress of my inquiries by what means the toil and trammels of calculation could be removed, and in the course of occupying every leisure moment I possessed with investigations of compendious methods of computing, I fell (in addition to the Logarithms, Rabdology, the Promptuary of Multiplication, and *other methods*) upon a certain arithmetical table, which, as it performs all the serious operations of vulgar arithmetic upon an abacus or chess-board, deserves to be called an amusement rather than labour." It appears from his manuscripts, to be afterwards considered, that our philosopher, as might be supposed, only accomplished all this by a most systematical progress through the whole theory of numbers, which he was endeavouring to accommodate to the practice of science, in a digest replete with philosophic beauty, when the magnitude of his own success deranged his plan, and the severity of his labours hastened his life to a close. But we cannot appreciate what he did, unless we keep in view both the state in which he found numbers when he determined to create a revolution in the system, and the state in which he left them at his death.

There is reason to believe that Napier took up the subject some time before the year

1594. He tells us himself, that he had invented the Logarithms long before he published them; and this agrees with the fact already noticed, that Dr Craig, soon after King James's visit to Tycho, wrote some account of the matter to that philosopher. In Napier's manuscripts, however, there does not appear the least trace of his great invention. Now it is impossible to suppose that it would not have been prominent in a work where he enters deeply into the arithmetic of surds, had the conception been then formed. As his treatise on arithmetic and algebra was found among his loose notes in an unfinished state, it seems more than probable that the invention of Logarithms arose out of these deep lucubrations, and would actually have formed a part of a great work on numbers, which he intended to have given the world had his life been spared. We must, therefore, fix the chronology of Napier as an algebraic writer sometime before the close of the sixteenth century, that is, during the rudest period of algebraic science in Europe. *Leonardo of Pisa* composed his work before the invention of printing, and early in the thirteenth century. But this had been lost sight of, and was not known for more than a century after Napier's death, when the manuscript was discovered at Florence. The first printed work on the subject was that of *Lucas de Burgo*, who brought his mercantile travels to the same good account as Leonardo, and from him is generally dated the decided dawn of algebra in Europe. De Burgo's principal work was published about the year 1494, and in 1539 the second printed book upon arithmetic and algebra appeared. This was a work of the great but eccentric *Cardan*, of whom it is affirmed by Scaliger, that he was so devoted to astrology, as to refrain from food, and actually die of starvation, to fulfil his own astrological predictions,—a very equivocal compliment to the mystical science. He died in the year 1575. Germany produced one or two philosophers, who, at the same time that Cardan wrote, gave a more decided impulse to numbers. Hitherto nothing had been added to that recondite science, since Arabic numerals, and the rude and imperfect symbols of Burgo's algebra, except in the theory of equations, which received a great extension from Tartalea and Cardan. The defect which materially clogged and impeded the system was in notation, the mainspring of numerical science, and of which the profoundest minds are most apt to see the philosophy and value. *Michael Stifellius*, a Lutheran clergyman, published at Norimberg, in the year 1544, his *Arithmetica Integra*, a very original Latin treatise on arithmetic and algebra, wherein he viewed numerical quantities, and their combinations, closely and ingeniously, and gave an impulse to algebra by improving its notation. He was the first to introduce the signs + and — for *plus* and *minus*, and also the character $\surd$, (a contracted R) which denotes the *radix* or root. Besides this he entered systematically into the consideration of arithmetical and geometrical progressions, pointed out the logarithmic properties of a corresponding series of powers and their exponents, which latter term he uses, and approached as nearly to the shrine of the Logarithms as it was possible for any one to do who formed no conception whatever of the great system itself. Another singular coincidence between Napier and Stifellius may

be mentioned. The latter was a zealous Protestant, and had persuaded himself, though by a less cool and philosophical consideration of the subject than Napier's, that the day of judgment was at hand. The anecdote is well told by Sir John Leslie in his Dissertation.—" Captivated, perhaps, by the wonderful properties of numbers, he fancied, as other ingenious persons have since done, that he could interpret the visions of the Apocalypse, and foretel the end of the world. He was so imprudent as to place that awful dissolution very near hand. Early in the morning of the day predicted, in the year 1553, he assembled his trembling flock in a wide open field, where he endeavoured to season their minds for the tremendous change by fervid prayers and pathetic exhortations. The sky was lowering,—the darkness thickened,—a portentous silence prevailed,—and the preacher rolled his thunders with overpowering energy. But the clouds soon passed away, the sun shone forth in his wonted splendour, and all nature smiled. The populace recovered their agitated spirits; and now breathing rage and disdain, they chased the unlucky prophet home with volleys of stones." Thus it would seem, that, although possessing a mind somewhat similar in its constitution, the German exceeded our own philosopher upon this subject, in the same proportion that he fell short of him in developing the power of the Arabic scale. What he added to the system of numbers was chiefly in algebraic notation; as for his ingenious observations of numerical progressions, they left that subject very much in the state that Archimedes had done. Another German, *Scheubelius*, published a work upon arithmetic and algebra about the same time, and of much the same description. In 1552 appeared the first treatise upon the subject in the English language, written by the unfortunate *Robert Recorde*. His works are curious and original, but only elementary. They are generally in the form of a dialogue between a master and scholar, and under such quaint titles as *the Pathway to Knowledge, the Ground of Arts, the Castle of Knowledge, the Whetstone of Wit*. He is chiefly remarkable in the history of algebra, for having added to its notation the sign of equality; " and to avoid (says he,) the tediouse repetition of these woordes, *is equal to*, I will sette, as I doe often in woorke use, a paire of paralleles, or gemowe lines of ane lengthe, thus =, bicause noe 2 thynges can be moare equalle." England seems to have thought nothing of her solitary algebraist, who, though an able and meritorious man, was suffered to die a prisoner in the Fleet for debt about the year 1558. Sir John Leslie, in his Dissertation, observes of this writer, " he was the first to propose the sign = for equality, but made no other advances; and during a period of most active enterprise, till the close of the century, algebra was not cultivated at all in this country." In France, the celebrated *Ramus*, under whom Napier may have studied for a time at Paris, wrote on arithmetic and algebra about the year 1560; but his work is also elementary rather than philosophical, and he left the science as he found it. *Raphael Bombelli*, whose algebra was published at Bologna in the year 1572, in Italian, wrote more elaborately and profoundly, but did not add any thing of consequence to the labours of his predecessors. The first that can be said to have done so, between the time of Stifellius and Napier, was

Simon Stevinus of Bruges, who published *La Practique D'Arithmetique* about the year 1582. He afterwards put forth other works upon arithmetic and algebra, along with a translation of some books of Diophantus, in all of which he evinced the highest genius for his subject. Algebraic notation received from his hands another of those impulses by which it has so gradually reached its present perfection; and arithmetic is indebted to him as the first who expressly promulgated the doctrine of *Decimal fractions*. It was most probably about this period that our own philosopher commenced his endeavours to create a decided revolution in the science of numbers. A contemporary of Napier's was the great *Vieta*, whose name reflects such lustre upon France. His algebraic work first appeared in 1600, but by this time Napier's studies had ripened into the Logarithms, which were at least in progress. The most accurate chronology of the time of our own philosopher's preparatory labours, therefore, so far as I have been able to ascertain, seems to be between the publications of Stevinus of Germany, and Vieta of France. The French philosopher generalized the language of algebra by employing letters to denote known as well as unknown quantities; and he extended the theory of equations. It is not likely that Napier ever saw his treatises, which were only first collected into one volume by Schooten in 1646. All the other great works that occur in the history of numerical science, are subsequent to the death of Napier. Countries the most distinguished in Europe for philosophers, had produced in that recondite path the few we have so briefly noticed; and although their names are illustrious and their labours profound, not one of them struck a blow sufficient to extricate the best wing of the mathematics, which, at the close of the sixteenth century, still remained with its arithmetic undeveloped, and its algebra little beyond the rude and infant state in which it was brought from the East. The name of Recorde is barely sufficient to give England a place in that history at all; and as for Scotland, until Napier arose, it was only famed for mists that science could not penetrate, and for the Douglas wars, whose baronial leaders knew little of the denary system beyond their ten fingers.

It is curious to think how much science had attempted in physical research, and how deeply numbers had been pondered, before it was perceived that the all-powerful simplicity of Arabic notation was as valuable and as manageable in an infinitely *descending* as in an infinitely *ascending* progression. It was only necessary to reverse the notation, and the power of the scale was doubled. How obvious and simple does that expedient now appear, "*Mais ces moyens simples sont le fruit des idées profondes et lumineuses.** The decimal fractional division itself was long conceived before that notation was established from which it derives all its value and beauty as a part of the Arabic system. Yet the history of this important chapter of numbers is carelessly recorded where we might have expected accuracy. "Regiomontanus," says a successor of Henry Briggs in the Savilian chair, "introduced that simple, but most valuable, modification of the decimal notation, which consists in fixing the unit's place at any figure, and not neces-

* Bailly.

sarily at the right hand, by placing there a comma, all arithmetical operations going on just the same; in a word, the use of decimal fractions."* It may be doubted if this sentence expresses its own meaning at all, but certainly it would leave any one, not previously enlightened on the subject, either in the dark or in error. By "decimal notation," we understand the professor to mean the whole system; and what he characterizes as "a most valuable modification of the decimal notation," to be Decimal fractions. Perhaps they are more properly to be called an extension than a modification of our numeral system; but it may be asked, how is the use of decimal fractions explained by saying that it "consists in fixing the unit's place at any figure, and not necessarily at the right hand, by placing there a comma?" This idea disturbs the simple and beautiful philosophy of the Arabic scale. By the comma of course is meant the *decimal point* or *separatrix*, betwixt the integers and fractions, a comma being sometimes used for that purpose; but the fact, that any number of decimals may follow any number of integers, by no means renders unit's place an arbitrary one. No doubt, in any row of figures, such as, for instance, 465.8329, a point placed between any two of them, say 5 and 8, converts all those to the right of the point into decimal fractions, and also indicates 5 as occupying the unit's place of the integers; but the unit's place is just as necessarily at the right hand as ever; it is at the right hand of the integers of which it is the unit; just as much so as if the fraction were noted in the vulgar form thus, $465\frac{8329}{10000}$; the shifting the point may alter the sum, but it never can change the character of unit's place, which must always be to the right of all the integers, and to the left of all the fractions. The reason is obvious, and the slightest attention to what is sometimes apt to be overlooked, the simple idea of our numeral scale, will clear the matter. The unit's place is said to be at the *right* hand just because its value increases from the bottom of the scale by progressing to the *left*. But Decimal fractions made no alteration in this valuable law; the unit, though accompanied by a tail of decimals as long as a comet's, still becomes 10, or 100, &c. only by progressing from right to left; therefore its place is always *necessarily at the right hand*; not perhaps at the calculator's right hand in any given sum of integers and decimals; but, strictly speaking, at the right extremity of the path, by its fluxion through which the unit acquires value. Again, what had Regiomontanus to do with the *decimal point?* No more than Archimedes. So far as a record of the fact can be traced, Napier of Merchiston, who lived a century after Regiomontanus, was the first to conceive the powerful idea of giving decimal fractions their proper value in the scale, by simply *reversing* the order of the original notation. He was also (according to Delambre) the first to perform calculations with decimal fractions, as in the arithmetic of integers; and he did so in the very work by which he unfolded his method of constructing the Logarithms. This fact is very interesting; and so little observed, that we cannot afford to have it still further obscured in a history of science.

* Historical View of the Progress of the Physical and Mathematical Sciences, &c. by the Rev. Baden Powell, M. A., F. R. S., Savilian Professor of Geometry in the University of Oxford. 1834. P. 116.

The principle of Decimal fractions is susceptible of a very simple illustration. A digit progressing from right to left, or from unit's place *in infinitum*, increases in a tenfold ratio; but, let the unit's place be marked by a point after it, and then suppose the digits to progress from unit's place to the right of the point in the same decreasing ratio of ten; and the Arabic system will thus be doubled simply by reversing the order of its notation. To the left of the unit's place are tens, hundreds, thousands; and to the right are tenths, hundredths, thousandths, &c. The idea, however, though apparently a very natural extension of the original system, is twofold; and only arrived at its present perfection by two distinct steps;—*first*, the decimal division in that direction; and *second*, the converse application of the decimal notation. A *sexagesimal* descending scale was used from the earliest times, having been introduced by Ptolemy in his trigonometrical tables; but the equivalent decimal system is of European growth. Purbach, as we have already noticed in the preceding memoir, first applied the decimal division to the radius of the circle, which he supposed to be divided into 600000 equal parts. Regiomontanus improved and extended this method, by computing the sines of the arcs for every minute of the quadrant to a radius of 1000000. This clearly introduced the *idea* of decimal fractions, but only indirectly; and it is a complete mistake to suppose that he had any thing whatever to do with their present punctuated notation. The decimal descending scale was so far from being practically introduced, even in Napier's time, that his early treatise on arithmetic, though it contains a beautiful exposition of vulgar fractions, makes no allusion whatever to decimals, of which at that time he appears to have had no notion, as a system.

In the *Rabdologia*, however, Napier, after some operations with vulgar fractions, adds what he calls *Admonitio pro Decimali Arithmetica*, the substance of which is as follows: "But should those fractions whose denominators are various be found disagreeable on account of the difficulty of working with them, and should that other kind, whose denominators are always tenth, or hundreth, or thousandth, &c. parts, (which that most learned mathematician *Simon Stevinus* in his decimal arithmetic notes and names in this manner, (1) *firsts*, (2) *seconds*, (3) *thirds*,) be preferred on account of their affording the same practical facilities as integers, then, the vulgar division being completed, and concluded with a period or a comma, you can add to the dividend or remainder one cypher for tenths, two for hundreths, three for thousandths, or more at pleasure; and with these proceed to operate as in the above example, where I have added three cyphers: the quotient being 1993.273, signifies 1993 integers, and 273 thousandth parts, or $\frac{273}{1000}$, or as Stevinus has it, 1993, $2'\ 7''\ 3'''$," &c. Sir John Leslie, in his Dissertation, alludes to this passage, when he says, "It was our illustrious countryman Napier that brought the notation of decimals to its ultimate simplicity, having proposed in his *Rhabdologia* to reject entirely the marks placed over the fractions, and merely to set a point at the end of the units." We must remark, however, that the learned knight's antiquities are here not quite accurate. Napier's work where this occurs was published in 1617; but in the edition

of *Pitiscus's* trigonometry, published in 1612, that author, in reference to the decimal division therein used, takes occasion to observe, " which parts are commonly written thus $\frac{5176381}{1000000}$; but it would be a much more compendious form, and fitter for calculation to write it thus 05176381, which means precisely the same thing; and in like manner the two numbers 09, and $\frac{9}{10}$ have just the same value." This is very nearly the notation proposed by Napier, and now in use; and therefore it would appear that Sir John Leslie's assertion in favour of our philosopher is met by the prior claim of Pitiscus. Dr Hutton, in his history of trigonometrical tables, gives the following version of the matter: " Pitiscus, *Trig.* lib. ii. p. 44, describes, for the first time that I know of, the common notation of decimal fractions as now used; and this same notation was *afterwards* described and used by Baron Neper in *positio* 4 and 5 of his posthumous work on the construction of Logarithms, published by his son in the year 1619." Here it will be observed that Dr Hutton refers to a different work of our philosopher than what is referred to by Professor Leslie, and this is curious, that both commit an error exactly the converse of the other. Hutton refers to Napier's *Constructio*, which was composed long before the work of Pitiscus, and yet he gives the priority of the idea of decimal notation to the latter author. Leslie only refers to the Rabdologia, not aware that this was published five years after what has been quoted from Pitiscus. Now, the real facts are as follow: Napier's treatise on the Construction of Logarithms was composed many years before 1614, when he published the Logarithms themselves. He expressly says so in his dedication of the Rabdologia to Lord Dunfermline; *(Logarithmorum Canonem, à me* longo tempore elaboratum, *superioribus annis edendum curavi;)* and in the posthumous work it is mentioned by Robert Napier, that his father had composed that for years *(aliquot annos)* before he invented the word Logarithms. Pitiscus, in his first edition of his trigonometry, printed in 1599, says nothing whatever about decimal fractions, and the work of his wherein he mentions them is dated 1612. With these facts not only within his reach, but actually before him, I can only account for Dr Hutton's merely saying that Napier described the modern decimal notation *after* Pitiscus, by the circumstance, that the English mathematician was upon every occasion unwilling to do justice to the Scotch philosopher. He ought, while recording this interesting portion of scientific antiquities, to have pointed out the certain reasons there were for saying that the exposition of decimals in Napier's posthumous work was written long prior to, and not in consequence of, the remark of Pitiscus in 1612.

But it may be said, why so much about a point in decimal notation? and perhaps it is necessary to assign a reason. The greatest mathematicians are those who are most likely to be interested by such facts in the history of science; because they know best how much has been achieved through the medium of *notation*. Mathematical science obtained one of its most powerful impulses in the simple expedient of the cypher, and it is curious to trace as nearly as possible who was the first to observe, that the same simple notation reversed acted with equal facility in the opposite direction. But it is highly interesting to discover that the first to do so was he who was the first to evolve, from the Arabic

system, the latent power of the Logarithms; and who was also the first to bring into full operation the calculation with decimal fractions, as Napier unquestionably was. Improvements in notation, however simple and gradual, are of vast importance in the history of mathematical science. The Logarithms themselves would inevitably have been *discovered* through the medium of improved notation, had Napier not *invented* them (if I may be allowed the distinction,) even before notation was ripe for their discovery. What transformed numerical computations into analytical science? The simple expedient of using the last letters of the alphabet to denote the object of search before it was found. When this symbolical language became yet more general, the power of algebra increased in proportion, and it was through such successive improvements in notation that Newton reached the binomial theorem. But it is not as a discovery for which the world is indebted to Napier, that we are anxious to record that the first idea of the existing notation of decimal fractions must be traced to him. It was truly at the suggestion of no individual that that notation came to be finally established. Long after Napier and Pitiscus had, independently of each other, proposed the method, mathematicians worked decimals in the vulgar form. Practical experience, however, gradually discovered the most perfect manner of doing so. And it is identically that which was so immediately perceived by Napier. We claim the fact for him, not that we may call him the author of the established notation, but, as affording a valuable illustration of the *power* and *simplicity* of his mind. That which experience has proved to be the perfection of the system is just what occurred to him at the very first, and before the world of science was ripe for the application; and hence it is valuable to show that his idea is of older date than the work of Pitiscus, and was not derived from that source. Had such been the case, Napier would have acknowledged the great Pitiscus as readily as he did Stevinus. We shall now turn to Napier's posthumous work, where the fact is fully recorded, and it will be seen that what in the work of Pitiscus is a mere passing observation, (indicative, however, of a great mathematical mind,) is, in our own philosopher's *prior* lucubrations, a system so brought out as to excite the surprise and admiration of DELAMBRE in modern times.

The circumstances under which the *Logarithmorum Canonis Constructio* appeared before the public after our philosopher's death have been already detailed. This was the work which Kepler in his letter expresses an eager desire to see, and certainly it could not have disappointed his most ardent expectations. No clearer or more elegant treatise upon a more recondite or valuable subject illustrates the history of numbers. The purpose of it is to shew by what methods he conquered the second, and not the least difficulty he had to encounter in his path to the Logarithms; namely, how to calculate the actual numbers to be intercalated betwixt the terms of his progressions, in order to reap the fruits of his first great conception. He begins by defining and giving examples of an arithmetical and geometrical progression as the foundation of his system. He then says, that what is requisite in such a system, is, first, *accuracy*, and second, *facility*,—that the former is obtained by laying a foundation of very large numbers, and the latter by

obtaining those large numbers, through the instrumentality of cyphers. This profound though simple opening leads him at once to the doctrine of decimal fractions, which I shall translate from his own words, and the reader will bear in mind that they were written at a period when not even an elementary treatise on arithmetic that has escaped oblivion existed in Scotland; and when Kepler himself was ignorant both of decimal fractions, and of Logarithms, as practical systems. "The less accurate," says Napier, "take 100000 as the largest sine, but the deeper calculators select 10000000, by means of which number, the difference betwixt all the sines can be better expressed. That is the reason why I have adopted it for the whole sine, and as the *maximum* of the geometrical progression. In computing tables, even very large numbers are to be made still larger by placing a period betwixt the original number, and cyphers added to it. Thus at the commencement of my computation I have changed 10000000 into 10000000.0000000, lest the most minute error might, by frequent multiplication, grow into an enormous one. In numbers so divided, whatever is noted after the period is a fraction, whose denominator is unity with as many cyphers after it as there are figures after the period. Thus 10000000.04 is equivalent to $10000000\frac{4}{100}$. So 25.805 is the same as $25\frac{805}{1000}$. 9999998.0005021 is $9999998\frac{5012}{10000000}$ and so on. From the tables so computed, the fractions placed after the period may be rejected without any sensible error, for in these very large numbers, the error is to be considered insensible and nugatory where it does not exceed unit. Thus when the table is completed, for the numbers 9987643.8213051, which are equivalent to $9987643\frac{8213051}{10000000}$, there may be taken 9987643 without any sensible error." *

This is the earliest conception of the existing notation of Decimal fractions that can be pointed to, and yet in these few words how completely is it developed! Let us compare it with the very latest treatise on the subject, and that is the article Arithmetic in the Encyclopædia Britannica, now in the course of publication,—Chap. ix. *Decimal Fractions.* "Decimal fractions are such as have 10, or some power of 10, (that is 100, 1000, &c.) for a denominator: such are these $\frac{3}{10}$, $\frac{24}{100}$, $\frac{75}{1000}$, $\frac{462}{100000}$; they are more simply written thus: .3, .24, .075. .00462; the number of figures after the point being always the same as the number of cyphers in the denominators. In decimal fractions, as thus written, the figures next the point to the right indicates so many tenths; the next so many hundreths, and so on. Thus in the fraction .346 the figure 3 expresses 3 tenths, 4 denotes 4 hundreths, and 6, 6 thousandths. The use of cyphers in decimals as well as in integers is to bring the significant figures to their proper places, on which their value depends, as cyphers when placed on the left hand of an integer have no signification, but when placed on the right hand increase the value ten times each; so cyphers when placed on the right hand of a decimal have no signification, but when placed on the left hand, diminish the value ten times each." Thus we see that Napier's first conception and explanation of that

* *Constructio Logarithmorum*, p. 6. How deep, and refined, and far in advance of his times, are the doctrines crowded into this single passage.

system, written many years before it came into universal practice, might be transferred verbatim into a treatise on the subject for the year 1834. It is remarkable that Sir John Leslie, in connecting Napier with the history of Decimal fractions, had not referred to the posthumous work rather than to the Rabdologia; for it was in the Constructio Logarithmorum, that the ordinary rules of calculation were first displayed working with equal facility upon the descending side of the scale. Delambre *(Astronomie Moderne*, p. 493, *et infra,)* was particularly struck with the fact, and I shall follow so far that illustrious philosopher's profound exposition of the work in question. "Napier," says he, "in his definitions, and even in his calculations, makes use of decimal fractions; but only gives the notation without any rule of calculation. It is the earliest example of them I have met with,—it is a first step, and one of the greatest importance," (*il est de la plus grande importance.*) Delambre then follows Napier through his method of calculating the terms of his geometrical progression, but takes the aid of modern algebraic symbols. It would occupy too much space here to give the process, for which the reader must be referred to Napier's own work, or other recondite sources. After detailing it, Delambre exclaims, "We here distinctly observe examples of *subtraction* in decimal fractions." Passing through some more of the calculations he again exclaims, "behold manifestly *division* in decimal fractions;" and further on he adds, "I have already remarked that Napier is the first to afford the idea of the calculation of decimal fractions, a little more developed afterwards by Briggs."

Such is the hold that Napier has of Decimal fractions, a part of the system, "which" says Playfair, "completed our arithmetical notation, and formed the *second* of the three steps by which in modern times the science of numbers has been so greatly improved." Of course the *first* step was Arabic numerals, and the *third* was the Logarithms; so when we take into consideration that decimals only came into active operation with the system of Logarithms, and that Napier is the first, who affords examples both of the calculation with decimals, and of their best notation, we may fairly say that his share in the developement of the great Arabic system is as two to one. The original algorithm, whose history is lost in distant climes and long past ages, brought as it were the telescope to numbers. When Napier reversed the notation, and caused it to act in the opposite direction, he may be said to have added the microscope; and he did so while creating the last and greatest revolution in the system,—when to ἀριθμοί he added that omnipotent word, which nor Greeks nor Brahmins knew, λογαριθμοί.* How proud a contempla-

* Ἀριθμοί signifies numbers, λογαριθμοί, the ratios of numbers; or, rather, the number of ratios, λόγων ἀριθμοί. Napier compounded the word before his system was known, but subsequent to the date of his invention. Dr Minto says, "the term Logarithm was first used by Napier after the publication of the canon in which he uses the term of *numerus artificialis.*" (Buchan and Minto's Life of Napier, p. 43). This is an extraordinary mistake. In the *Constructio* Napier used the latter phrase, but a profound consideration of his own system led him to frame the term Logarithms before he published his canon; and the first knowledge of the system that the world obtained was through that nomenclature which

tion for Scotland, to observe the most recondite department of science receiving its finest and most powerful expansions in the hand of a Scottish baron of the 16th century.

It is singular, that while Dr Hutton, in the history commented upon, would lead his readers to suppose that the Logarithms had been attained by some natural transition from the observation of numerical progressions, in which many calculators were simultaneously engaged, he has elsewhere recorded another error, the very antipodes of the former, in which he supposes the Logarithms to have been viewed and reached through an algebraic medium which belongs to a period of science whose date is long after Napier. Our author, in his Mathematical Dictionary, *(Exponent of a power,)* after stating that "exponents, as now used, are rather of modern invention," and noticing the rude and cumbrous approaches made towards their present notation, finally traces that system to *Descartes* and *Girard*, both of whom, it must be observed, wrote after Napier was dead. He then adds: "The notation of powers and roots by the present mode of exponents, *has introduced* a new and general arithmetic of exponents or powers; for hence powers are multiplied by only adding their exponents, divided by subtracting the exponents, raised to other powers, or roots of them extracted, by multiplying or dividing the exponent by the index of the power or root. So $a^2 \times a^3 = a^5$, and $a\,\frac{1}{2} \times a\,\frac{1}{4} = a\,\frac{3}{4}$; $a^5 \div a^6 = a^2$, and $a\,\frac{3}{4} \div a\,\frac{1}{2} = a\,\frac{1}{4}$; the 2d power of a^3 is a^6, and the 3d root of a^6 is a^2. *This algorithm* of powers led the way to the invention of logarithms*, which are only the indices or exponents of powers: and hence the addition and subtraction of logarithms answer to the multiplication and division of numbers; while the raising of powers, and extracting of roots is effected by multiplying the logarithm by the index of the power, or dividing the logarithm by the index of the root." Thus we have two different accounts of the invention of Logarithms furnished by Dr Hutton. The one is, that many learned calculators, about the close of the sixteenth and the beginning of the seventeenth century, "set themselves" to find the Logarithms through the numerical properties pointed out by Archimedes, and actually laid down all the necessary principles; so that "many persons had thoughts of such a table of numbers;" though, he admits, "the world is indebted for the first *publication* of Logarithms to John Napier." Dr Hutton's other account, however, is, that

has stood the test of ages, and remains unchanged under every new application, and every refined analysis of the Logarithmic power. The word of itself affords evidence, that, although Napier demonstrated his system by the geometrical means of fluxions and fluents, his consideration of the subject was just as arithmetical as Kepler's. Delambre has well observed of Kepler's method of proportions, "*ce système est celui de Néper—cette origine rend raison de la dénomination* logarithmique *qui signifie* nombre des raisons; *mais cette dénomination est de Néper, ainsi que l'idee qui la lui a fournie: λογων αριθμος.*"

* Dr Hutton's own explanation of *algorithm* is; "the common rules of computing in any art; as the algorithm of numbers, of algebra, of integers, of fractions, of surds, &c. meaning the common rules for performing the operations of arithmetic, or algebra, or fractions, &c." Now the *arithmetic of powers and exponents* had no existence until after Napier's death.

the *algorithm of powers*, as that was established by Descartes and Girard *after Napier's death*, and towards the middle of the seventeenth century "led the way to the invention of Logarithms!" That we may clear up this matter to the general reader, it is necessary to say a few words of powers and exponents,—a doctrine which derives its whole efficacy from its system of notation.

The product of any number multiplied by itself is called a *power* of that number. Thus 9 is a power of 3, because three times three is nine. The multiplication by the same number may be prolonged to any extent, and all the successive products are called powers of that number. So our arithmetical scale, 10, 100, 1000, &c. is composed of the powers of 10. In this series, however, there is a property inherent in its system of notation, namely, that the number of cyphers of the product mark the number of times that the multiplier, or root, has entered into the operation of producing it. Thus 100 is equal to 10 multiplied by 10; or, to express it algebraically, $10 \times 10 = 100$. So $10 \times 10 \times 10 = 1000$. By a rule in algebra, the philosophy of which it is unnecessary to expound here, a number is considered the first power of itself. So 100 is the 2d power *(square)* of 10; 1000 the 3d power *(cube)*; 10000 the 4th power, &c. Another notation, however, to the same effect, is to repeat the root itself with a small number beside it, indicating the order of the power, thus 10^2, 10^3, 10^4, &c. Here is an example of the modern notation of powers and exponents. But it is only the notation in a particular case, and must be generalised before it can acquire the important place it actually holds in the system of numbers. One grand distinction betwixt arithmetic and algebra is, that the former considers and works a question in reference only to a particular case, while the latter affords a general rule for a variety of cases. Hence in algebra the letters of the alphabet are taken as symbols to represent indefinite quantities. The notation of which an example is given above may be considered as applicable to any geometrical progression of numbers, and consequently, is capable of being expressed in the general language of algebra. Thus take any number a for the root, or first power, and its successive powers will be a^2 a^3 a^4, &c. which signify the same as aa, aaa, $aaaa$, &c. or it may be still further generalized, a being taken for the root, and x for the exponent, thus a^x: this expression is called an exponential quantity, where a may stand for any root, and x for any exponent; and therefore a^x may represent all possible values or numbers from zero to infinity. The universal exponential notation, of which an example is here given, belongs to a vast and fertile field of algebraic analysis, that cannot be said even to have opened in Napier's time. Stifellius, Bombelli, Stevinus, and a few others, made some rude attempts to denote the exponents of powers by indices, or small numbers; but this notation was not immediately appreciated or improved, and even Harriot, whose algebra appeared long after Napier's death, denotes the order of the power, by the defective and cumbrous expedient of repeating the root itself, thus, a, aa, aaa, &c. To the great Descartes is yielded the merit of the exponential notation now in use, and hence it is called the *Cartesian*

notation. Through this it was that the universal arithmetic of powers and exponents became developed. The system was found to be flexible to any extent and in every direction. The *law of continuity* (or that algebraic principle which considers a numerical scale as indefinitely extended in both directions, ascending and descending) introduced inverse powers and negative exponents, as the reciprocals of direct powers and positive exponents,—an extension precisely similar to that which Napier first gave to the arithmetical scale, when he proposed the notation of Decimal fractions. The doctrine of fractions was also applied to exponents; and it was discovered that integral and fractional exponents, whether rational or surds, belonged equally to the same system of notation, and could be worked in the same manner. Thus decimals came to be used as fractional exponents. In short, passing through many illustrious hands, the exponential system obtained an unlimited extension, so that in Newton's it reached the Binomial Theorem, which may be called the bridge that spans the chasm betwixt common algebra and the higher calculus.

One result of this analytical developement, even before it reached the crisis of Newton, was very important, but not so exciting as it would have been had Napier not anticipated the treasure. It is obvious that the exponents of any root compose an arithmetical series, adapted to a geometrical one which is composed of the powers whose values the exponents express; consequently, when it was discovered that an exponent might be a number of any denomination, integral or fractional, negative or positive, rational or surd, it followed directly that every number whatever might be considered as a power of any given number. Thus, for example, 100 is a power of 10, whose exponent is 2, *i. e.* $10^2 = 100$. Now, as the value of a power depends upon its exponent, and as the system is found to be infinitely flexible, it follows that the numbers betwixt (say) 10 and 100 could be viewed as powers of 10, having their values denoted by *fractional* exponents; for, although none of these powers would be *commensurable*, the doctrine of surds afforded a notation expressive of approximations infinitely near the truth. Here, then, is the adaptation of an arithmetical to a geometrical series, including numbers of every possible description, so that the logarithmic principle observable in the Arabic system is no longer confined to the ascending decuple scale, but, from a special arithmetical case, has become an algebraic law of universal application. It would have been impossible to have reached this refined extension of the notation of powers and exponents, without detecting all those operations by means of the exponents which afford the same results as the more complicated operations with the corresponding powers; and by this path Napier's great invention must have been discovered; for the observation is perfectly just, that in whatever terms the method of Logarithms has been stated and explained, its principle *may be reduced* to this, "that all numbers are feigned to be equal to the powers of a certain assumed number."

Had the Logarithms been disclosed through this gradual progress of the notation of powers and exponents, however valuable the discovery, it would probably not have at-

tached an immortal name to any individual. We would have been indebted for it to all those who had improved and advanced the algebraic notation in which it lurked. It would have been insensibly attained, as it were, in the natural and inevitable course of numbers, and would have been due to a system, the very dawn of which had not appeared in our philosopher's lifetime, *unless that dawn be his own work.* Professor Playfair remarks particularly, that Napier could derive no assistance from such analytical considerations, but arrived at the Logarithms by an original path of his own; and for that reason he bestows this eulogy upon him, that, "as there never was any invention for which the state of knowledge had less prepared the way, there never was any where more merit fell to the share of the inventor." Yet the real value of this praise, which is as just as it is high, has been obscured in quarters where we would have least expected confusion on the subject. Professor Powell, whose work, already referred to, is the latest history of mathematics in which Napier is mentioned, has transferred almost *verbatim* to his own text Playfair's account of the Logarithms and eulogy of their author. But, overlooking the real point of that eulogy, the Savilian professor adds rather inconsistently, "Hence, to conceive the fundamental idea, that all numbers might be regarded as some powers of one given number, and to devise the actual means of finding the indices of those powers, must be allowed to have been indications of genius of the highest order." But the fundamental idea here assumed to have been Napier's, belongs to a subsequent developement of algebraic analysis, independently of which, for *that* was his great merit, he achieved the Logarithms. It is an idea belonging to that mature state of the exponential system wherein a chapter, "*De quantitatibus exponentialibus ac Logarithmis,*" * is made preliminary to an exposition of the infinitesimal analysis. But it is at variance with the history of analytical science to suppose that Napier could generalize like Euler, which, however, he must have done if he really reached the Logarithms by the contemplation in question. Delambre, while he views the Canon Mirificus through the modern analysis, is most careful to avoid giving the impression that Napier did so, or had the aid such a view implies; "C'est par anticipation (says he) que j'ecris na, n^2a, n^3a, &c. on n'avait encore aucune idée des exposans;" and wherever that philosopher uses such expressions in reviewing our philosopher's work, he reminds the reader that Napier did not look through any such medium as this *translation* of his thoughts might seem to imply; "ce calcul est *la traduction* de ses raisonnemens." Herschel observes, that Wallis's *Arithmetica Infinitorum*, published in 1655, is the first work "in which we find that full reliance on what is called the law of continuity in analytical expressions, which has since led to so many brilliant generalizations;" but that "the notation of exponents was invented by Descartes." Now unquestionably the fundamental idea attributed to Napier is only co-existent with a knowledge of the full meaning and utility of exponential notation; and we would put it, therefore, to the *manes* of Dr Hutton, and the *cathedra* of Professor Powell, whether, before the close of the six-

* *Introductio in Analysin Infinitorum. Auctore Leonhardo Eulero*, 1797, cap. 6.

teenth century, Napier can be supposed to have generalized in this form $a^x = y$? * Did he *select a base* for his system? or consider a base in Logarithms at all? or can he be supposed to have known that e (a transcendental number begotten upon the Canon Mirificus by the Binomial Theorem,) † was really the base of his own original and parent system of Logarithms? If he could know nothing of all this, then it is only confounding the history of his invention to say, that the algorithm of powers led to it, or that the foundation of his conception was the analytical idea, that all numbers might be regarded as some powers of one given number.

But we verily believe, that, had Napier lived twenty years longer, he would have reaped in rapid succession many of those laurels which the path of analytical science yielded so gradually to many philosophers between him and Newton. In his letter to King James, he tells that monarch that he could bring him gifts as rare as Tycho's. He verified that hint with the Canon of Logarithms. In his dedication of the Logarithms, he tells Prince Charles, that, if he received them in good part, it would "encourage me, that am now almost spent with sickness, shortly to attempt other matters perhaps greater than these." Had he been spared, this promise, too, would have been realized. There was before him the whole of that wonderful field of analytical inquiry, from which, by anticipation, he had already snatched one of its most precious disclosures. We must now turn to his manuscript "Booke of arithmeticke and algebra," which affords the most convincing proofs, that with an innate algebraic power equal to Newton's, but without one

* The equation $a^x = y$ contains various relations. x is the *exponent* of a; y is the *power* of a; a is the *root* of y; x is the *logarithm* of y; y is the number of which x is the logarithm. Thus it is obvious that the *exponent* of a and the *logarithm* of y mean the same quantity. In this equation a is also termed *the base*, and so x is the *logarithm* of y *to the base* a. Of this algebraic generalization the algorithm $10^2 = 100$ is a particular arithmetical case. 2 is here the *exponent* of the operation of raising 10 to its second power, 100; 2 is therefore the logarithm of 100, and 10 is *the base* of that logarithm. These are modern refinements in analytical science of which Napier knew nothing. He had not the algorithm.

† The letter e in modern algebra is taken to represent the base of Napier's first system of logarithms, which is the fundamental and parent system of all logarithms. That base is equal to the number 2.7182818. Now, until the binomial theorem, and the modern doctrines connected with it, afforded new and comparatively easy methods of computing logarithms, the number e was unknown. A treatise on arithmetic and algebra, published by the Society for the Diffusion of Useful Knowledge, details the algebraic process which produces the number e, and the author adds, "the student will find $e = 2.7182818$; this quantity then is known; the discovery of it does not at present appear to have brought us nearer our object, but we shall find it a necessary instrument in arriving at it; it is the base of a system called the *Napierean*, from Napier, a celebrated mathematician of the seventeenth century, who invented logarithms, and *calculated them to this base*." But this is a complete mistake. Napier did not calculate his system to a base at all; it might as well be said that he computed his tables through the *expansion of* a^x, or by means of a *a rapidly convergent series*. Napier was so far in advance of science that men forget when he lived. Delambre most justly observes, that the easiest methods of computing logarithms were discovered after the greatest difficulty and toil had been accomplished.

of the many powerful aids which the English philosopher obtained from the algebra of his day, Napier, ere he found the Logarithms, had launched himself in the very path most likely to have led him even to the Binomial Theorem.

This very interesting fragment has hitherto been secluded in the family charter-chest. Unfortunately it is written in Latin, and would occupy upwards of 130 quarto pages, so is not suited for an appendix to his memoirs in its original state. I shall endeavour to give such an account of it as will afford some insight into the nature of the preparatory study, and mental discipline, through which our philosopher passed to the complete accomplishment of his greatest design. The reader must not fail to keep in view the circumstances of its ancient date, and the local disadvantages under which the treatise was written. We have already noticed the works upon the same subject that were published before he can be supposed to have written anything; and, considering how few they were, how slowly books were then spread abroad, and that literary communication between Scotland and the Continent was then so slight, as to leave Kepler in ignorance of Napier's death two years after that event, we must not suppose that our philosopher had at his command even those scanty sources of information the Continent could afford on the abstruse subjects to which he was attached. This is not to excuse defects or rudeness in his treatise on numbers, but to enhance the surprise that he should then have written as he did, and that even his unpublished papers should be so worthy to meet the eye of modern mathematicians. Any one who now takes the trouble to peruse the Canon Mirificus, and his other published works, (and this is rarely done even by men of science), will be struck, not merely with the invention, but with the power, simplicity, and elegance that characterise all his treatises, and the air that pervades them of having been written a century after his time. The very same may be said of the manuscript we are about to consider. Whole chapters of it might be literally translated and transferred to the most careful and recondite treatise on numbers of the present day. Yet it is the oldest treatise of the kind composed in Britain. Recorde's works are rudely elementary compared to this of Napier's, which is a beautiful treatise on the philosophy of numbers, free not merely from the puerile *facetiæ* * of the old English writer, but, what is remarkable, from every vestige of mysticism or superstition. It must have been composed before he had formed an idea of the Logarithms, because although the arithmetical part is entire, and brought to a close, there is not the slightest allusion to his great invention, nor to the system of Decimal fractions. I presume, therefore,

* "*Master.* Exclude number, and answer this question; how many years old are you? *Scholar.* Mum.—*Master.* How many days in a week? how many weeks in a year? what lands hath your father? *Scholar.* Mum.—*Master.* So that if number want, you answer all by mummes. How many miles to London? *Scholar.* A poak full of plums.—*Master.* If number be lacking it maketh men dumb, so that to most questions they must answer mum," &c. "What call you the science you desire so greatly? *Scholar.* Some call it *arsemetrick*, and some *augrime*.—*Master.* Both names are corruptly written, *arsemetrick* for *arithmetic*, as the Greeks call it, and *augrime* for *algorisme*, as the Arabians sound it," &c.—*Recorde's Arithmetick.*

it was written before he had seen the work of Stevinus, which he quotes in the Rabdologia. Unquestionably it is the oldest philosophical treatise on numbers composed in Scotland.

The general plan and division of his subject is of itself sufficient to show the profound and comprehensive view he had taken of numerical science. He terms his subject, generally, LOGISTIC *(logistica,)* which he defines "the art of computing well," and his principal division of it is into four books, of which the *first* (he says) regards the computation of quantities common to every species of logistic; the *second* relates to Arithmetic, which he defines, "the Logistic of *discrete quantities* by *discrete numbers*;" the *third*, he calls Geometrical Logistic, and defines it "the Logistic of *concrete quantities*, by *concrete numbers*;" the *fourth* is Algebra, which he defines, "the science of solving questions of magnitude and multitude" (*quanti et quoti.*) The classification of his system, minute, clear, and philosophical, affords a striking illustration of what Robert Napier declared to be the acknowledged characteristics of his father's mind, namely, the power with which he could condense, and the simplicity with which he could expound. The first book consists of eight chapters, and commences in this simple manner.

"*Logistic* is the art of computing well. *Computation* is the action or operation which, from several given quantities and their properties, finds what is sought. These are given either by *vocal nomination*, or in *written notation*. Hence in all Logistic, first comes *nomination* and *notation*, and then follows *computation*. Computation is either *simple* or *compound*. That is simple computation which, from two given quantities, finds a third by a single or uniform operation. Simple computation is either *primative* or *derivative*. That is primative computation which computes one quantity with another only once; and which, from any two of a whole, a part and a remainder given, finds the third. Primative computation is either *Addition* or *Subtraction*. Addition is that primative computation in which several quantities are added, and a whole is produced: *ex. gr.* let 3 and 4 be added, and there will be produced 7 for the whole: so let 2, 3, and 4 be added, and there will be produced 9. Subtraction is that primative computation in which the *subtrahend* is taken from the *minuend*, (*subtrahendum a minuendo,*) and a *remainder* is produced. Thus, let 4 be taken from 9, and 5 remains. 4 is called the subtrahend, 9 the minuend, and 5 the remainder. Subtraction is either of *equal* quantities and nothing remains, or of *unequal* quantities. The subtraction of unequal quantities, is either of the *less* from the *greater*, and the remainder is a quantity greater than nothing (*major nihilo,*) or it is of the *greater* quantity from the less, and the remainder will be less than nothing (*minus nihilo*). Thus, subtract 5 from 5, and there remains nothing: subtract 3 from 5 and there remains 2 more than nothing: but subtract 7 from 5 and there remains 2 less than nothing, or nothing diminished by 2. Hence the origin of *defective* quantities, namely, by the subtraction of the greater from the less, and of these I shall speak in their proper place. From the premises, it is clear that Addition and Subtraction are related; and thus the one is the proof (*examen*) of the other. Thus, as a proof whether

2 is the remainder of 3 from 5, add 2 and 3, and 5 is restored. On the other hand, as a proof whether 2 and 3 added make 5, subtract 3 from 5 and 2 is restored; or otherwise subtract 2 from 5 and 3 is restored. There is, besides, another proof of subtraction in itself, namely, by subtracting the remainder from the minuend, so as turn the first subtrahend into the remainder; thus, as the proof whether 2 be the remainder of 3 from 5, subtract 2 from 5 and 3 is restored. And so it is, that any two of a *whole*, a *part*, and a *remainder* being given, you have the third by Addition and Subtraction."

Having disposed of his general view of primative computation in this first chapter, Napier passes in the second to derivative (*ortæ*,) which he defines, "the computation of quantity with quantity more than once." He considers it as derived either from Addition and Subtraction, by a repetition of those primative operations (*ortæ ex primis*,) which gives *Multiplication* and *Division (Partitio;)* or as derived from these again (*ortæ ex primo ortis*,) which gives *radical-Multiplication* and *radical-Partition;* in other words, involution and evolution. Nothing can be more elegant and symmetrical than the manner in which he brings out the *genealogy* of those great operations whose prolific field was all before him. We have seen, in the first chapter, that his leading division is into *simple* and *compound* computation. He regards all simple computation as having to do with three quantities, of which any two are given, and the third is to be found from them; and he also shows how intimately all simple computations are related to each other; the different species of the same kind being the mutual proofs of each other, and the different kinds naturally arising each out of the more primative. He shows how Addition and Subtraction test each other. Multiplication he views as *continued Addition*, and defines it thus elegantly; "Multiplication is the continued addition of either of the two given quantities, as often as there are units in the other; the product is the *multiple;* thus 3 multiplied by 5 is the same as 3 five times added, or 5 three times added; being 15." The three quantities in this operation he calls the *multiplier*, the *multiplicand*, and the *multiple*. Division he views as "the continued subtraction of the *partient* from the *partitor* until nothing remain, and the number of subtractions is the *quotient*." He then shows that Division may be perfect or imperfect, and points out how "*fractions* derive their origin both from the partition of the less by the greater, and the *imperfect* partition of the greater by the less;" and he concludes, as in the previous chapter, by showing that Multiplication and *perfect* Division mutually prove each other. The third chapter contains the third class of simple computation, namely, that which is derived from Multiplication and Division by a *repetition* of those operations. Here the three quantities considered are thus defined; "the *radicate* * is that quantity

* What Napier calls *radicatum* is now called *power*. It forms another of the several coincidences between Napier and Sir Isaac Newton, that the latter also wrote a Latin work upon arithmetic and algebra, entitled *Arithmetica Universalis*, being the substance of his lectures delivered at Cambridge. In that work I find Newton, like Napier, uses the words *index* and *radix;* but the third quantity he calls "*dimensio, vel potestas, vel dignitas*." Napier's *radicatum* will bear the most hypercritical scrutiny; it regards the quantity as rooted, or composed of roots, which are to be decomposed, or evolved, in

which returns to unit by repeated partition by some other quantity; the number of partitions is the *index*, the dividing number is the *root*." These three quantities he considers subject to three operations; 1. *radical*-Multiplication, which he defines, the continued multiplication of the given *root*, as often as there are units in the *index*, to produce the *radicate* sought;" and he shows that the remultiplication may be infinite; it may be " *duplication*, which is the multiplication of two equal quantities together, or the given quantity placed twice, *(bis positæ)*; *triplication* is the given quantity thrice placed, &c. in these cases the radicate becomes the *duplicate*, or *triplicate*, or *quadruplicate*, &c. the index is *two*, or *three*, or *four*, &c. the root is *bipartient*, or *tripartient*, or *quadripartient*," &c. The example he affords is by placing 2 for the root, and 2 for the index, and then he raises 2 to the seventh power, as " in the following table, where the prior series (*prior series*) are *indices*, and the latter *radicates*.

" I	II	III	IIII	V	VI	VII	&c. *
1 . 2	4	8	16	32	64	128	&c."

He next considers, (in the same chapter) 2. *radical*-Partition, which he defines, " the continued partition of the *radicate* by the *root* down to unit, and the number of partitions is the *index* sought. In the fourth chapter, he takes up the important case of, 3. *Extracting the root* itself. He defines this process, " finding that third quantity which, the *index* being given, raises the given *radicate* by radical-Multiplication, or resolves it by radical-Partition." He then lays down that the extraction may be *perfect* or *imperfect*; " perfect where there is no remainder,—imperfect where a remainder is left irresoluble; thus, if the *tripartient*-root is to be extracted from the radicate 9, the nearest number is 2, which by radical-Multiplication raises 8, and not 9; it is, therefore, called an imperfect extraction, as 1 remains unextracted; whatever numbers so remain are termed irresoluble (*irresolubiles*;) the number obtained by the imperfect extraction is called the *lesser term*, to which, by adding unit, the *greater term* is obtained; between which terms the true and perfect root lies hid." Our philosopher then proposes a very

order to produce the *index*, which again denotes the quality of the *radix*. *Radicatum* being thus expressive, I have translated it *radicate* instead of power.

* It is curious to find, in this example, the inventor of Logarithms framing a logarithmic table *unconscious* of that property of the particular arrangement. The reader will at once perceive the *Archimedean theorem* in the numeral arrangement quoted; the upper series being truly logarithms to the lower. But Napier gives it without any reference to that particular property. Had this been his first step to the Canon Mirificus, that work would have presented a very different aspect. We would probably have heard nothing of his *fluxions* and *fluents*; but every thing about the arithmetic of *indices*; he would have *selected a base* for his system, and that a simple one; the tables computed under those circumstances would probably have been of the kind called *antilogarithms*. *(See Dr Hutton's History of the Construction of Logarithms, and Dodson's Preface.)* The example shows that Napier had not the exponential system in a state to reach the logarithms by that path, though he unconsciously affords a rude table of powers and exponents as well as of logarithms; had he simply repeated the *root* instead of giving the *radicate*, and then reduced his *indices* to small numerals thus, $2^1, 2^2, 2^3, 2^4, 2^5, 2^6, 2^7$, he would also have afforded a specimen of the *Cartesian notation*.

curious notation of his own for these imperfect roots, which shall be afterwards noticed more particularly. His next proposition is, that "in radical-computations, some indices are *even* and some *odd*; some again are *prime*, *i. e.* only divisible by unit, others *composite*, *i. e.* perfectly divisible by some other number." After giving examples, he adds, "hence a compendious method of radical-Multiplication and Extraction where the indices are composite, for it is easier to multiply, or extract, by means of the component parts of the index separately, than by the composites themselves," &c. He closes this chapter, as the former ones, by showing that each of the three operations of radical computation is proved by the other two. This concludes his general view of *simple* computations,—their relations to and dependencies upon each other. I may here observe that he never leaves a term without a definition, or a proposition without examples.

The remaining four chapters of the first book are devoted to the general view of "*compound* computation, or *Rules*." This he defines "the computation which, by several and divers modes of operation, produces the quantity sought from several given quantities." The fifth chapter accordingly treats of compound computation, embracing rules of *proportion* and *disproportion*. It contains a remarkable example of his practical powers, and of his unremitting attempts to create compendious rules where he found them wanting. I shall translate it, therefore, nearly at length, as he seems to have laid some stress upon his own peculiar method; and it may be doubted if any thing better is to be met with on the subject even now.

"Rules of Proportion are those which solely by means of simple proportionate computations, such as Multiplication and Partition, discover from several given quantities the quantity sought; as, if it be asked, how many miles he may go in 6 hours who goes 4 miles in 3 hours? or,—if 6 oxen be nourished for 4 days upon 3 measures of hay, how many oxen may be nourished in 2 days upon 5 measures? or,—20 shillings Scotch are 1 pound, 2 pounds are 3 marks, 5 marks are worth 1 crown; how many shillings, then, are 9 crowns worth? Questions of proportion have no introduction through Addition and Subtraction; for Multiplication and Partition are proportional computations as a consequence of their definitions. Two things are considered in such computations,—*position*, and *working*. Position is regulated by four precepts. *First*, that a line be drawn, and a place prepared under it for the quantity sought, along with its collaterals, as follows, in terms of the three examples given above.

1. $\frac{\text{6 hours, 4 miles.}}{\text{3 hours, how many miles.}}$ 2. $\frac{\text{6 oxen 5 meas. 4 days.}}{\text{how many ox. 3 meas. 2 days.}}$ 3. $\frac{\text{20 shil. 2 pnd. 5 mr. 9 cr.}}{\text{how many shil. 1 pnd. 3 mr. 1 cr.}}$

Second, that two quantities, of which the one decreases as the other increases, be placed as collaterals on the same side of the line. As, in the first example, by how much the first hours abound, namely, 3, so much fewer will be the miles sought; in the second example, as the number of oxen increase, the number of days in which they may be nourished on the same measure decrease; hence, 3 hours and the miles sought,—6 hours and 4 miles,—again, 6 oxen and 4 days,—the oxen sought and 2 days,—are respectively

placed on the same side of their lines. *Third*, that two quantities increasing or decreasing together, must be placed on the opposite sides of the line; thus, as the 3 hours increase, so must the 4 miles, *et contra*," &c. "*Fourth*, that two cognominate quantities be always separated by the line; as in the first example, 3 hours to 6 hours, and 4 miles to the miles sought," &c. "These precepts of *position* being attended to, the following single general precept of *working* will suffice for the solution of every question of this kind."—"*Multiply the upper quantities together, also the lower together; then divide the multiple of the upper quantities by the multiple of the lower; and the quotient will solve the question by giving the quantity sought.* Thus, in the first example, 6 and 4 multiplied make 24, which divide by 3, and that will give 8, the number of miles sought;—or, in the second example, 6, 5, and 4 multiplied make 120, then multiply 3 and 2, which make 6, by which divide 120, and that will give 20 and solve the second question;—or, in the third question, multiply 20, 2, 5, and 9 together, which make 1800; then multiply 1, 3, and 1, which make 3, by which divide 1800, and that will give 600, the number of shillings which are equal in value to nine crowns. In this manner, *I bring every species of rules of proportion under one general method and operation.* The authors treat of infinite species and forms of the doctrine of proportion, such as the rules of three or the golden, of simple, double, five-quantities, six-quantities, direct, inverse, &c. but they have not touched the triple rule, or any of its manifold forms, all of which you have here in this brief form."*

"So much for Rules of Proportion; the Rules of Disproportion follow; but as these, besides the proportional computations, embrace additions and subtractions and other computations disturbing proportion, mixed up together, therefore I dismiss all these, as what may be sufficiently comprehended under algebra. As the rules of alligation, society, falsehood, simple proportion, double proportion, and many others, form the greatest part of all arithmetical rules, so of geometrical rules do propositions, problems, theorems, &c. which, confused both from their variety and number, disturb the memory. These therefore I leave, to be presently treated of under algebra."

Having disposed of quantities "*in genere*," Napier takes up the division "*suarum specierum.*" His first division of the species is into abundant and defective quantities, *(abundantes et defectivæ,)* to which the sixth chapter is devoted. Upon this chapter our philosopher lays much stress, and I shall give it entire.

"Abundant quantities are those which are greater than nothing *(majores nihilo,)* and carry the idea of increase along with them. These have either no symbol prefixed, or this one +, which is the copulative *(copula)* of increase. Thus, if you are not in debt, and your wealth be estimated at 100 crowns, these may either be noted 100 crowns, or

* *Recorde's* Arithmetic confirms this remark. There I find, the golden rule direct and inverse, the double rule of proportion, the rule of proportion composed of five numbers, the rule of fellowship, the rule of alligation, the rule of falsehood; but nothing similar to Napier's. He made every rule *golden* that he touched; witness his *trigonometrical rules.*

+ 100 crowns; and are read a hundred crowns of increase; always signifying wealth and gain. The computations of such quantities are to be learnt both from what has been said and what is to follow. Defective quantities are those which are less than nothing *(minores nihilo,)* and carry the idea of diminution along with them. These are always preceded by this symbol —, which is the copulative of diminution. Thus, in the estimation of his wealth whose debts exceed his goods by 100 crowns, justly his funds are thus prenoted, — 100 crowns, and are read, a hundred crowns of decrease; signifying always loss and defect.* I have already shown that defective quantities have their origin in

* *Abundant* and *defective* terms are now used in a totally different sense. A number is sometimes considered as composed of *aliquot* parts, *i. e.* of other numbers, any one of which, being repeated a certain number of times, makes up the whole number precisely; thus 1, 2, and 3, are the aliquot parts of 6. Now when the aliquot parts of a number, added together, make up a sum greater than that number, they are the aliquot parts of an *abundant* number; if less, of a *defective* number; if precisely the number, as in the example given, it is a *perfect* number. The terms now in use to express Napier's idea are *negative* and *positive*. Sir Isaac Newton, in his Algebra, says, " *Quantitates vel* affirmativæ *sunt, seu* majores nihilo; *vel* negativæ *seu* nihilo minores. *Sic in rebus humanis* possessiones *dici possunt bona affirmativa,* debita *vero bona negativa;*" the very example which Napier gives. Dr Horsley, Newton's commentator, observes at this passage; " *Albertus Girardus, ni fallor, omnium primus, (quem summum interea mathematicum agnosco,) durâ quâdam verborum figurâ, Diophanto et Vietæ prorsus ignotâ, quam vellem Cartesius et nostrates minus avide arripuissent,* nihilo minores, *dixit.*" This shows how neglected Napier's great work is by the learned. Horsley, of course, could not know, that in Napier's *unpublished manuscript* there was a chapter upon this distinction, but he might have read in the *Canon Mirificus,* c. i. p. 5, " *Logarithmos sinuum, qui semper* majores nihilo *sunt, abundantes vocamus, et hoc signo* +, *aut nullo prænotamus; logarithmos autem* minores nihilo *defectivos vocamus, prænotantes eis hoc signum* —." This was published *fifteen years* before the work of Girard, to which Horsley alludes. Dr Hutton, in his History of Algebra, has fallen into the same mistake; " Girard was the first who gave the whimsical name of *quantities less than nothing* to the negative ones." Here is another indication that Hutton analyzed Napier's works, and presumed to attack his character, without reading the original proofs as he ought to have done. Even Leslie and Playfair had not read the *Canon Mirificus.* The former says, " Girard was possessed of *fancy* as well as invention; and his fondness for philological speculation led him to frame *new terms,* and to adopt certain modes of expression which are not always strictly logical; though he stated well the contrast of the signs *plus* and *minus,* in reference to mere geometrical position, he *first introduced* the very inaccurate phrases of *greater* and *less than nothing.*" Playfair says, " Girard *is the author* of the figurative expression, which gives the negative quantities the name of *quantities less than nothing;* a phrase that has been severely censured by those *who forget* that there are correct ideas which correct language can hardly be made to express." It is, indeed, *unphilosophical* fastidiousness to call the phrase " very inaccurate." Napier fortified it by a better *nomenclature,* in the terms *abundant* and *defective,* than those now in use,—*positive* and *negative,* which are said to convey erroneous impressions. Again, his *exemplification* of the idea is that which is invariably adopted now, though not from him. Surely *Euler* was never rummaging in the Merchiston charter-chest? Yet his illustration is identically Napier's; " In algebra, simple quantities are numbers considered with regard to the signs which precede or affect them. Farther, we call those *positive quantities,* before which the sign + is found; and those are called *negative quantities* which are affected by the sign —. The manner in which we generally calculate a person's property is an apt illustration of what has just been said; for we denote what

subtracting the greater from the less. Abundant and defective quantities come under the operation of Addition; where the signs are alike, by prefixing their common sign to their aggregate sum; thus, + 3 and + 2 make + 5; but if their signs are unlike, they are added by prefixing the sign of the greater quantity to the difference between them; thus, + 6 and — 4 make + 2. In Subtraction they are worked by changing the sign of the *subtrahend*, and adding it to one or other of the given quantities according to the foregoing rules; thus, in subtracting + 5 from + 8, change + 5 to — 5, then, as before, add — 5 to + 8, which gives + 3, the remainder sought; so to subtract + 8 from — 5, change + 8 into — 8, which added to — 5 gives — 13, the remainder sought; so — 5 from + 8 gives + 13; and + 5 from — 8 gives — 13; and — 5 from — 8 gives — 3; and + 8 from + 5 gives — 3; and — 8 from + 5 gives + 13; and — 8 from — 5 gives + 3. Abundant and defective quantities are multiplied and divided, where the signs are alike, by prefixing to the *multiple* or the *quotient* the sign of *plus*, (pluris;) or, if unlike, the sign of *minus*, (minutionis:) thus, + 3 multiplied by + 2, or — 3 multiplied by — 2 produce the multiple + 6; and if + 6 be divided by + 3; or — 6 by — 3, the quotient + 2 is produced. But if + 3 be multiplied by — 2, or — 3 by + 2, the multiple will be — 6; and if + 6 be divided by — 3, or — 6 by + 3, the quotient will be — 2."

" *Roots*, both abundant and defective, having an *even index*, when radically multiplied produce an abundant *radicate;* thus, multiply the root + 2 to the index 4, and there will be given, *first*, + 2; *second*, + 4; *third*, + 8; *fourth*, + 16; in like manner — 2 gives, *first*, — 2; *second*, + 4; *third*, — 8; *fourth*, + 16, as before. Hence it follows, that an *abundant radicate*, whose index is even, has two roots, one *abundant*, and the other *defective*, and that a *defective radicate* has *no root;* for in the above example both the abundant + 2, and the defective — 2, are the quadripartient (*fourth*) roots of the abundant radicate + 16; therefore there are none remaining, either abundant or defective, which can be the

a man really possesses, by positive numbers, using or understanding the sign +; whereas his debts are represented by negative numbers, or by using the sign —: Thus, when it is said of any one that he has 100 *crowns*, but owes 50, this means that his real possession amounts to 100—50; or, which is the same thing, + 100—50, *i.e.* 50. Since negative numbers may be considered as debts, because positive numbers represent real possessions, we may say that negative numbers are *less than nothing;* thus, when a man has nothing of his own, and owes 50 crowns, it is certain that he has 50 crowns *less than nothing;* for if any one were to make him a present of 50 crowns to pay his debts, he would still be only at the point of nothing, though really *richer* than before. In the same manner, therefore, as positive numbers are incontestably greater than nothing, negative numbers are *less than nothing.*" *Maclaurin*, too, defends the phrase, but illustrates the idea more poetically; " the depression of a star below the horizon may be equal to the elevation of a star above it; but those positions are opposite, and the distance of the stars is greater than if one of them was at the horizon so as to have no elevation above it, or depression below it; it is on account of this contrariety that a *negative* quantity is said to be *less than nothing;* because it is opposite to the positive, and diminishes it when joined to it, whereas the addition of 0 has no effect; but a negative is to be considered no less as *a real quantity* than the positive." The opinion of Leslie, who calls the phrase *inaccurate*, and of Hutton, who calls it *whimsical*, must go down before the opinions of Napier, Newton, Maclaurin, Euler, and Playfair.

quadripartient root of the defective radicate — 16. Abundant roots, having *uneven indices*, when radically multiplied yield abundant radicates; and defective roots, defective radicates; thus, the abundant root + 2, when radically multiplied to the uneven index 5, yields + 32; namely, *first*, + 2; *second*, + 4; *third*, + 8; *fourth*, + 16; *fifth*, + 32, the abundant radicate; so the defective root — 2, with the index 5 radically multiplied, yields — 32, namely, *first*, — 2; *second*, + 4; *third*, — 8; *fourth*, + 16; *fifth*, — 32, the defective radicate of the said root. In like manner hence it follows that a radicate with an uneven index has only one root, an abundant radicate an abundant root, and a defective radicate a defective root; as in the former example, the abundant radicate + 32 with the index 5, will have the abundant root + 2; so the defective radicate — 32, with the same index, will have the defective radicate — 2. It is unnecessary to repeat here the rules of proportion, as they are compounded of multiplications and partitions, and may be learned from what is premised."

In a subsequent part of his manuscript, when treating of the notation of irrational roots, we shall find Napier referring to this chapter as the foundation of *a great algebraical secret, not previously revealed by any one.* This shall be considered more particularly, when we come to notice the chapter where these expressions occur. It must be observed, however, that he here lays down the general rules of the arithmetic of *plus* and *minus*, and connects the chapter with his system, in a manner not surpassed, if equalled, in the treatises of Newton, Maclaurin, and Euler.

Our philosopher, in the next place, passes to his second special division of quantities, namely, into *integral* and *fractional.* "Those quantities," says he in chapter seventh, "are called *integral*, which have no denominator, or whose denominator is unit; and those *fractional*, whose denominators are various. The *denominator* is the quantity placed *under* the line, and indicates the number of parts into which unity is divided; the *numerator* is the quantity placed *above* the line, and denotes how many of those parts are taken. For instance, this quantity $3ab$ is an integral quantity; so is $\frac{3ab}{1}$, which is the same thing written in the form of a fraction; again, $\frac{3ab}{2bc}$ and $\frac{5a}{2}$ and $\frac{3a}{2a}$ or $\frac{3}{2}$, which is the same thing, are fractions or broken quantities, whose higher terms are the numerators, and whose lower terms are the denominators." Our philosopher then reminds his reader that it had been previously observed how broken quantities are also produced greater than unit, namely, by the *imperfect* division of the *greater* quantity by the less. "Thus, 9 divided by 2 yields $4\frac{1}{2}$, or, if you prefer it, $\frac{9}{2}$ greater than unit. Hence every numerator sustains the part of the quantity divided; and its denominator, of the quantity that divides it; as in the former example, $\frac{3ab}{2bc}$ signifies that $3ab$ is divided by $2bc$; so $\frac{3a}{2a}$ has the same value as $3a$ divided by $2a$; or, more briefly, 3 divided by 2; or, finally, it has the same value as three parts of unity divided into 2; so $\frac{3}{4}$ are three-fourths of unity, or three divided by four, which is the same thing. * Every quantity having a

* EULER might have written all this; indeed he has written something very like it; he traces from the same source as Napier does the "particular species of numbers called *fractions*, or *broken numbers*;"

numerator and denominator is considered and worked as a fraction, and hence, in order to compute with integers as if they were fractions, 1 is placed beneath them as their denominator. The computation with fractions is facilitated by contracting and abbreviating their terms (*termini*). This is done by dividing the terms in their increased form by their greatest common divisor. * The greatest common divisor is that than which a greater cannot be found capable of *perfectly* dividing each term; and it is found, first by dividing the greater term by the less; then by always dividing the preceding divisor by its remainder until nothing remain; that last divisor, the quotients being neglected, is the greatest common divisor sought; thus, the greatest common divisor of the terms 55 and 15 is found in this manner: divide 55 by 15, there remain 10; divide 15 by 10, there remain 5; divide 10 by 5, and nothing is left over; 5, therefore, is the greatest common divisor, measuring 15 by 3, and 55 by 11. If, however, you arrive at unit for the divisor, then the terms are inabbreviable, and prime, or prime to one another; thus, let the terms be $5a$ and $3a$, divide $5a$ by $3a$, and there remain $2a$; then divide $3a$ by $2a$ and $1a$ remains, by which divide $2a$ and there is no remainder. Hence $5a$ and $3a$ have not a greater divisor than unity, or $1a$, by which if those terms be divided, they become to each other the prime numbers 5 and 3, as more fully shall be laid down in its proper place. But this must be specially looked to in the partition of incommensurable quantities that it will go on eternally without end, as will plainly appear in its proper place; thus of the number 10 and its *bipartient* root, or, *as it is called, square root*, no common measure will be found in eternity; much less that greatest divisor; as in its proper place.

he explains the example $\frac{7}{3}$, and then says, " so, in general, when the number a is to be divided by the number b, we represent the quotient by $\frac{a}{b}$, and call this form of expression a fraction; we cannot, therefore, *give a better idea* of a fraction $\frac{a}{b}$, than by saying that it expresses the quotient resulting from the *division of the upper number by the lower;* we must remember also that in all fractions the lower number is called the *denominator*, and that above the line the *numerator*." He turns and views his subject precisely as Napier does; " the nature of fractions is frequently considered in another way, which may throw additional light on the subject. If, for example, we consider the fraction $\frac{3}{4}$, it is evident, that it is three times greater than $\frac{1}{4}$. Now, this fraction $\frac{1}{4}$ means, that if we divide 1 into 4 equal parts, this will be the value of one of those parts; it is obvious, then, that by taking 3 of those parts, we shall have the value of the fraction $\frac{3}{4}$."—*Hewlett's translation of Euler's Algebra*, 1822.

* " In order to reduce a given fraction to its least terms, it is required to find a number by which both the numerator and denominator may be divided. Such a number is called a *common divisor*; and as long as we can find a common divisor to the numerator and the denominator, it is certain that the fraction may be reduced to a lower form; but, on the contrary, when we see that, except no unity, other common divisor can be found, this shows that the fraction is already in its simplest form." This property of fractions preserving an invariable value, whether we divide or multiply the numerator and denominator by the same number, is of the greatest importance, and is the principal foundation of the doctrine of fractions. For example we can seldom add together two fractions, or subtract the one from the other before we have by means of this property reduced them to other forms."—" All whole numbers may also be represented by fractions; for example 6 is the same as $\frac{6}{1}$ because 6 divided by 1 makes 6," &c.—*Euler's Algebra.*

Having obtained the greatest common divisor, and divided by it each term, the new terms arise; and this operation is termed abbreviation."

We now come to the eighth and last chapter of Napier's first book, and he treats his subject so very like Euler, that we are almost surprised to find him at the addition and subtraction of fractions in his eighth chapter, when Euler is only at the same subject in his ninth. But then we must always recollect what his son said of our philosopher, *ex optimorum hominum sententia, inter alia præclara hoc eximii eminebat, res difficillimas methodo certâ et facili,* quam paucissimis *expedire.* "Fractions," says he, "of the same denomination are subject to the operations of addition and subtraction. If their denominators are diverse they may be reduced to the same. This is done by dividing each denominator by the greatest common divisor, the quotients being noted, then by multiplying both the terms of the first into the quotient of the latter denominator, you have the first new fraction;* and multiplying both terms of the latter by the quotient of the former denominator, gives the latter new fraction of the same denomination: thus, to reduce the fractions $\frac{2}{3}$ and $\frac{7}{9}$ to the same denomination; of denominators 3 and 9, the greatest common divisor is 3, by which divide them and you have 1 for the first, and 3 for the latter; then multiply each term of $\frac{2}{3}$ by the last quotient 3, and $\frac{6}{9}$ is produced as the first new fraction; in like manner multiplying $\frac{7}{9}$ by unit, which is the first quotient, gives the fraction $\frac{7}{9}$ of the same denomination as $\frac{6}{9}$. Being so reduced, these fractions are *added* or *subtracted* by adding or subtracting the numerators; the sum, or remainder, being taken as numerator, and the common denominator retained," &c. In the same minute and lucid manner, and always preserving the perfect symmetry of his arrangement, our philosopher proceeds to lay down rules for multiplication, partition, extraction of roots, radical multiplication, and radical partition of fractions. This closes the first book, being his exposition of the principles and rules "common to every species of logistic."

It is particularly striking to observe that his manner of treating the subject is not surpassed, if equalled, in modern times. With few resources beyond his own mind, living in a rude age, and in a country whose barbarian darkness in science he was the first to break, Napier surveys the vast field of computation, and not only reduces its complicated elements to a lucid order far before his times, but displays in the task

* We must here observe, that Napier at once gives the most simple and perfect method of adding and subtracting fractions, and that Euler, although he indicates his knowledge of the rule, only details more imperfect ones. It is a striking fact, of which any one may easily satisfy himself, that this perfect rule of Napier's is not taught in the elementary books. A note to Euler's algebra says, "the rule for reducing fractions to a common denominator may be concisely expressed thus: Multiply each numerator into every denominator except its own, for a new numerator, and all the denominators together for the common denominator." This is also the rule *Maclaurin* gives. Now it happens to be the *worst* rule, and Napier's is the *best.* Napier's exposition of fractions, throughout all his manuscript, is perfect.

a philosophical power, and a grasp of mind superior to that of EULER.* That philosopher's *Elements of Algebra*, written in the eighteenth century, are perhaps the severest test we could adopt of the excellence of Napier's unpublished fragments of the sixteenth century. There is, indeed, a remarkable similarity between the treatises, and it is manifest that the illustrious German viewed his subject nearly with the same mental eye that Napier did. Still his treatise is less methodically arranged, less symmetrical, less classic than Napier's, the characteristics of which may be expressed in the words (written so lately as 1830) of Sir John Leslie; "Nothing is more wanted for the purpose of education than a classical treatise on algebra, which, avoiding all vague terms and hasty analogies, should unfold the principles with simplicity and rigid accuracy, and follow the train of induction with close and philosophical circumspection." Our philosopher's exposition fulfils this rule in every particular, and many of his sentences are actually to be found in our most distinguished modern treatises on algebra, as if they had been translated from him. For instance, in the English translation of Euler, I find it said, "this rule for the division of fractions is often expressed in a manner that is more easily remembered, as follows: *invert the terms of the divisor*, so that the denominator may be in the place of the numerator, and the latter be written under the line; then multiply the fraction, which is the dividend, by this inverted fraction, and the product will be the quotient sought: thus, $\frac{3}{4}$ divided by $\frac{1}{2}$ is the same as $\frac{3}{4}$ multiplied by $\frac{2}{1}$, which makes $\frac{6}{4}$, or $1\frac{1}{2}$." Turning to Napier, to see how he treated this rule two centuries earlier, I find the very same; "*partiuntur autem (fractæ) invertendo terminos divisoris, et inversos per partiendum multiplicando omnimode ut superius in multiplicatione: ut sint* $\frac{5}{10}$ *partiendæ per* $\frac{3}{4}$, *hujus divisoris inverte terminos, et fient* $\frac{4}{3}$, *quæ per* $\frac{5}{10}$ *multiplicatæ fient primò per abbreviationem* $\frac{1}{10}$ $\frac{4}{1}$, *deinde* $\frac{1}{5}$ $\frac{2}{1}$, *deinde per multiplicationem superiorum invicem, et inferiorem invicem fient* $\frac{2}{5}$ *quotus optatus, et superiores multiplicationis examen.*" Again, Maclaurin's† expressions, "when unit is the greatest common measure of the numbers and quantities, then the fraction is al-

* "The algebra of Euler is in various respects a most remarkable production. That illustrious analyst, when totally deprived of sight in his advanced age, dictated it in the German language to a young domestic whom he trained for an amanuensis. He was obliged, therefore, to be plain, distinct, and perspicuous; and these qualities he combined with richness of invention."—*Leslie.* Euler seems to have resembled Napier in his moral character also. "Sweetness of disposition, moderation in his passions, simplicity of manners, were his leading features. Nor did the equability and calmness of his temper indicate a defect of energy, but the serenity of a soul that overlooked the frivolous provocation, the petulent caprices, and jarring humours of ordinary mortals. Possessing a mind of such wonderful comprehension, and dispositions so admirably formed to virtue and to happiness, Euler found no difficulty in being a Christian. Accordingly his faith was unfeigned, and his love was that of a pure and undefiled heart."—*Account of Euler prefixed to the Translation of his Algebra.*

† "In our own language, Maclaurin's *Elements of Algebra*, though a posthumous work, is perhaps the ablest on the whole, and the most complete."—*Leslie.*

ready in its lowest terms; and numbers whose greatest common measure is unit are said to be *prime* to one another," might stand as a translation of Napier's, "*verum si ad unitatem partitorem perveneris, inabbreviables, discreti tamen sunt termini, aut se invicem habentes ut discreti.*" Again, the author of the article Arithmetic in the latest edition of the Encyclopædia Britannica, observes, after going through the rules of the multiplication of fractions, "hence we infer that fractions of fractions, or compound fractions, such as $\frac{2}{7}$ of $\frac{5}{3}$, are reduced to simple ones by multiplication; the same method is followed when the compound fraction is expressed in three parts or more." Napier, after going through the rules of the multiplication of fractions, in like manner adds, "*hac multiplicatione fractiones fractionum, imo et fractiones fractionum iterum atque iterum fractarum, ad simplices fractiones* reducuntur: *ut duæ quintæ trium quartarum sic notatæ* $\frac{2}{5}$ *ex* $\frac{3}{4}$ *per præmissam fiant primo* $\frac{1}{5}$ $\frac{3}{4}$ *per abbreviationem*," &c. Sir John Leslie, in explaining Lord Brounker's fractions, observes, "when the original fraction is expressed by rational numbers, its decomposition must always terminate; but, if the numerator and denominator be mutually incommensurable, the process of evolving their elements will never draw to a conclusion." Napier notices the property in these words, "*verum hic summopere cavendum est a partitione incommensurabilium quantitatum, cujus nullus in æternum erit finis, ut suo loco perspicuum evadet.*" Maclaurin gives the rule to reduce an improper fraction to a mixed quantity thus: "Divide the numerator of the fraction by the denominator, and the quotient shall give the integral part; the remainder set over the denominator shall be the fractional part." Napier gives it thus: "*fit autem restitutio hæc partiendo numeratorem per denominatorem, et emerget in quotiente integra quantitas, et relinquiæ erunt numerator, et divisor erit denominator fractionis illæ mixtæ et adjunctæ.*" In short, it appears that our philosopher, before he, or any one else, had conceived the system of Decimal fractions, so thoroughly commanded the difficult doctrine of vulgar fractions, that his exposition of them may be placed side by side with the best treatises on the subject now. Profoundly conscious of the unlimitable play of numbers, his mind penetrated the unexplored field of the Arabic system in every direction. His first, and leading idea throughout, is to show how the prominent operations upon quantity and number, gradually unfold; and how the vast fabric produces itself, growth after growth, every rule the parent of another, and the whole intimately related in all its parts, as one endless family of numbers. This is peculiarly interesting from the person for whom the immortality was yet in store to compress with such effect that very expansion. He shows how Multiplication and Division rise out of the parent operations Addition and Subtraction, and how the involving of radicates, and the evolving of roots, rise in their turn out of Multiplication and Division. He afterwards, by his invention of Logarithms, provided the means of obtaining all the third quantities, hitherto sought in the complicated rules, from the more simple operations of their respective primatives. He explored the prolific system in all its channels, and then condensed it to a greater power.

Having given the *genealogy* of numbers, in the next place with what genius he seizes *unit*, breaks it into a new and infinite scale, and reduces to order and beauty all the great operations of arithmetic upon its fractions. The subsequent computation of his Logarithms, however, brought out a new system of fractions in *Decimals*. No sooner had he found these, than he at once took the view that now prevails; he regarded the great Arabic scale as acting reciprocally, in opposite directions, from right to left, and from left to right; and, rejecting in this case the notation of broken numbers, he *proposed the point* to distinguish the reciprocal play of the decuple progression. But the treatise we are considering shows that his mind had been long previously matured for such fearless and prolific views of computation. His arithmetic of *plus* and *minus* is a most interesting chapter, and full of genius. Before viewing an infinite scale in the fragments of *unit*, he takes *zero*, and considers that unpromising symbol as the focus of a reciprocal scale of *integers* extending infinitely above and below the thus dignified cypher. Destined to accomplish the Logarithms out of their natural course of discovery, he dared to conceive a scale below nothing, and to say *quantitates minores nihilo!* He showed, in this conception, how the primative operations of Addition and Subtraction, with their distinguishing signs, gave out another infinite scale in opposite directions from zero; and in this profound exposition of + and —, he is followed as closely by Euler as if the German philosopher had written with Napier's manuscript before him. In some particulars, however, the modern treatise is superior to the ancient fragment. In the *first* place, it possesses that perfect system of algebraic notation which, between the dates of Napier's work and Euler's, had been successively moulded in the hands of Vieta, Girard, Wallis, Harriot, Descartes, and Newton. In the *next* place, Euler has a chapter upon *Decimal fractions*, and three chapters upon *Logarithms*, so that his system is complete and Napier's is not. We shall find, however, that the important subject of *notation* was not left untouched by our philosopher; and as for the systems he omits, what made him throw aside and leave unfinished this beautiful institute of numbers, but that he paused to create those very systems, that he *did create them*,—and died.

In the second book, Napier comes, as he says, to *particulars*. Through these I must follow him less closely, but shall endeavour to select what is curious and interesting. In the first chapter he proposes a third division of computation, and I shall translate the most of it, as it contains his definitions, and also a beautiful statement of the Indian notation, before that had been enriched by its European, or we may say *Neperean* stores. "In the third place, computation is either of *verinomial*, or *fictinomial*, otherwise *hypothetical* quantities; and hence logistic is either of *verinomes*, which are treated of in this second book, and also in the third; or of *fictinomes*, otherwise *algebraics*, concerning which the fourth book treats. Verinomes are quantities defined by the actual terms in which their multitude or magnitude is expounded; and they are either *discrete*, *i. e.* named in discrete number; or *concrete*, *i. e.* named in concrete number. Hence *verinomial logistic* is either of discrete quantity, and called *Arithmetic*, of which this book treats, or

of concrete, called Geometric (*geometrica*,) of which in the third book. Arithmetic, therefore, is the logistic of discrete quantities by discrete numbers. A discrete number is that which is measured by its single individual number. A discrete number is either whole or broken. Hence arithmetic is of *integers* and *fractions*. An integer is that which is measured by its own individual unity. Every idiom supplies its own vocal nomination of integers; as, in Latin, *unum*, *duo*, *tria*, *quatuor*, &c. But the written names of integers, or their *notation*, are these nine significant figures, 1, 2, 3, 4, 5, 6, 7, 8, 9. These signify various numbers, according to their change of place. Besides these nine figures, there is the circle 0, which has no signification wherever it is placed, but is destined to supply the vacancies. The series of places is considered from right to left, in the first of which the figure is named by its own value as above; in the second place, by its tenfold value; the third, a hundredfold; and so on *in infinitum*, always progressing by a tenfold increase." After giving examples, our philosopher proposes, for the sake of facility in reading great numbers, to point them off in threes; thus, 4.734.986.205.048.205, which he reads in Latin, *quatuor millies mille millena millia millium . septingenta triginta quatuor millies millena millia millium . nongenta octoginta sex millena millia millium . ducenta quinque millia millium . quadraginta octo millia . ducenta et quinque.*

In the second chapter, he passes from *nomination* and *notation* to *computation*, and displays the operations of Addition and Subtraction, taking his first example from the book of Genesis. The third and fourth chapters are devoted respectively to Multiplication and Division, and he shows the most perfect command of all these operations. He gives the well-known multiplication table. The fifth chapter is entitled, " Miscellaneous short methods of Multiplication and Division." In this occurs a distinct genesis and notation of Decimal fractions in Arithmetic, and perhaps the earliest on record. Our philosopher observes, that to divide any number by a divisor composed of unit and cyphers is easily effected by striking off so many figures from the right of the partiend, as the divisor contains cyphers; and he directs the figures so struck off to be placed above a line as the numerator of a fraction having the divisor for denominator; and the fraction thus formed to be adjoined to the remainder of the partiend in order to form the quotient. The example he gives is, 865091372, to be divided by 100, and, according to the above rule, $8650913\frac{72}{100}$ is the quotient. Napier goes through this operation apparently unconscious of the important nature of the fraction thus obtained. Had he proposed simply to point off the figures deducted, so as to separate the right extremity, or unit's place, of the remaining integers from the broken numbers, he would have obtained his quotient by the most compendious rule possible, and at the same time have given his own notation of Decimals, and that now in use. But the system was comparatively valueless in Arithmetic until the Logarithms appeared, and it is obvious from the above example that Napier's manuscript must be referred to a very early date. Clearly he had not seen the work of Stevinus, which he afterwards mentions in Rabdologia, and had formed no conception

of his system of Logarithms, which, indeed, may be called the parent of the system of Decimal fractions.

In chapter sixth our philosopher, with a fearless composure becoming the conqueror and king of numbers, enters the formidable field of involution and evolution. This, as we have seen, he terms radical multiplication, partition, and extraction. Euler himself had not a more thorough command of the relative quantities, *root*, *power*, and *exponent*, than Napier had of *radix*, *radicatum*, and *index*. His opening statement of involution is less perplexing than that of the illustrious German, whose statement might leave the student at a loss to know why the *square* of a number is called the *second* power, seeing Euler at the same time informs him that a power of a number derives its dignity from "the number of times it is multiplied by itself," and that "we obtain *a cube* by multiplying a number *twice* by itself." Napier creates no such perplexity at the outset, for he commences by saying that the first step in the process of involution is to "multiply *unit* by the root, which multiplication returns the root itself; *secondly*, multiply that by the root and the *duplicate* [*i. e.* square or 2d power] is raised, and so on, according to the quality of the index; thus if 235 is to be multiplied to the index 4, [*i. e.* raised to the 4th power] first multiply unit by the root 235, which gives 235; multiply that again by the root, and 55225, the duplicate, is obtained," &c. "Hence," he adds, "radical multiplication repeated any number of times from unity is the same thing as to multiply together so many equal roots; thus, 235 four times multiplied from unity is the same thing as 235.235.235.235 multiplied into each other;" a law which now would be thus generally and shortly expressed $a^4 = a \times a \times a \times a$. Napier, indeed, had not arrived (and be it remembered that he is writing before *Vieta*, *Harriot*, and *Oughtred*, and when "algebra was not cultivated at all in this country,") at that powerful notation without the aid of which it was impossible for him to take some more recent views of the exponential or potential system. He did not possess the algebraic refinement of working *known* quantities by means of other symbols than the significant digits, or of expressing powers by small letters instead of numerals and initial signs. He did not, for instance, consider *aaaa* as (to use his own term) the *quadruplicatum* of any number *a*; far less did he consider the same quantity in this form, a^4. While he had not the *literal* notation of *powers*, neither had he the *numeral notation* of *indices;* for although, in explaining their genesis, he named the indices, one, two, three, &c. and even noted them 1, 2, 3, &c., yet he did not systematically attach them to the root for the expression of the power. To have done so would have been to have established the *Cartesian* notation, whose epoch is 1637. But in each definition he shows his thorough command of the subject, and how capable he was of reaping every laurel in that great field of analytical inquiry which *notation* opened to his successors. For instance, the exponent of a power is thus defined in modern science: "Exponent of a power in arithmetic and algebra denotes the number or quantity expressing the degree or elevation of the power, or which shows how often a given power is to be divided by its root before it be brought down to unity or 1; it is otherwise called the

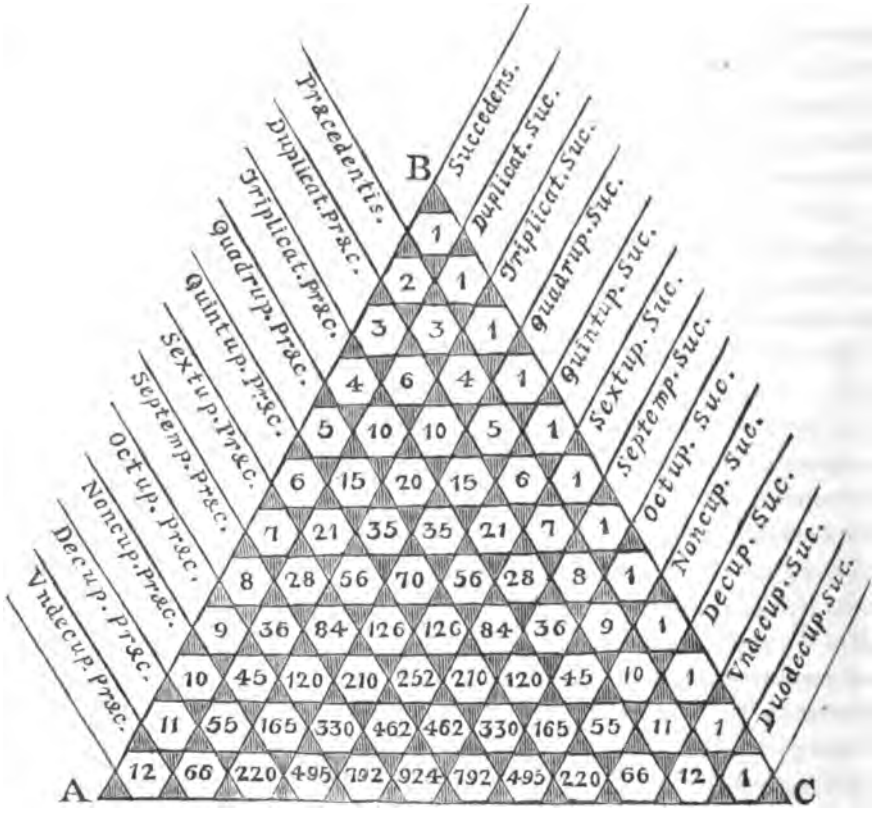
index. Exponents, as now used, are rather of modern invention," &c.—(*Hutton's Math. Dict.*) Now, although Napier had not the *algorithm* which opened the arithmetic of exponents, (and which Dr Hutton so unaccountably says, "led the way to the invention of Logarithms,") his view of that important quantity is precisely what is here stated. He says, "the number of the index, or quality of the root, is obtained as well in descending from the radicate to unity by partition, as in ascending from unity to the radicate by multiplication, for in either case the *number* of the operations is the index and quality of the root."

We must now turn to his chapter of the extraction of roots; a subject of which it has been observed, that among all the questions which the developement of our ideas of number places in review before us, there is none which, independently of the importance of the solution, has a greater tendency to excite the curiosity of every mind born for calculation; it is comparatively easy to raise roots to powers, but when we demand the roots back again it is not so easy to obtain them. *(Bertrand.)* Accordingly, the seventh chapter of the second book of Napier's manuscript is entitled "of finding the rules for radical extraction;" and here our philosopher is disclosed to us at the very confines of the Binomial Theorem.

"Every root," says he, "has its own appropriate and particular rule of extraction. Each rule of extraction consists in resolving the radicate into its supplements (*in sua supplementa.*) The supplement (*supplementum*) is the difference between two radicates of the same species. Thus 100 and 144 are both duplicates [squares,] the one of ten and the other of 12; and the difference between them is 44, which is the true supplement of the foresaid radicates. Supplements are as various, therefore, as the varieties of the species of radicates and roots. There is one rule for finding the supplements of duplication and of the extraction of the bipartient root, another of triplication and the extraction of the tripartient root, and so on of all the rest. But *my triangular table*,—filled with little hexagonal areas, having, on the right side, a series of units inscribed, and on the left a series from unit increasing by unity, and descending from the vertex; every one of the little areas within containing a number each equal to the sum of the two numbers placed immediately above it,—teaches the rules of finding the supplements of all radicates and roots."

"Let A, B, C, be a triangle, of which A is the left angle, B the vertical, and C the angle to the right. By so many species of roots as you wish the table to contain, into twice as many parts, and one more, divide each side of the triangle; for instance, in order to extend it to 12 species of extractions, let each side of the triangle be divided into 25 equal parts; then beginning from the base A C, draw 12 parallel lines within the triangle, connecting the sides by the points in them alternately taken: in like manner, begin from the side A B, and draw 12 parallel lines betwixt the alternate points of the base, and the side B C, extending the lines beyond the side B C, about the space of an inch; exactly in the same manner draw the lines betwixt the side B A and the base, extending

them an inch beyond B A; and you will have the triangle filled with little hexagonal areas. Of these, the 12 to the right, and next the line B C, must each have unit inscribed within it; those on the left must have the numbers 1, 2, 3, 4, &c. as far as 13, (exclusive) successively inscribed in each, descending in their order from the vertex B to the angle A; then each interior hexagonal remaining vacant must have inscribed the sum of the two numbers immediately above it; thus, under 2 and 1, must be written 3, under 3 and 3, 6; under 3 and 1, 4, and so on down to the heel of the table. Lastly, the table must be titled, on the left side above the second hexagonal (2,) let there be written *præcedentis*, above the third hexagonal, (3,) write *duplicatum præcedentis*, and so on as far as *duodecuplicatum*. On the right hand of the table write above the first hexagonal, *succedens*, above the second, *duplicatum succedentis*; above the third, *triplicatum succedentis*, and so on down to *tredecuplicatum*; as you have here in the diagram of the table itself written below."



"To every supplement two parts of the root correspond, the one part consisting of one

The above diagram is a fac-simile from the manuscript.

or more left hand figures, already found, and which is called *præcedens;* the other consisting of a single figure immediately on the right, which is to be sought for, and this is called *succedens.* The supplement and these parts of the root mutually compose each other, and are built up together, as will afterwards appear." *

In the rest of this chapter our philosopher lays down rules for reading the table by means of the titles annexed, and refers generally to its use in the extraction of roots. In the two following chapters, namely, the eighth and ninth, he shows its application more particularly, and affords a long and profound exposition of the difficult doctrine of evolution.

The remarkable similarity between Euler's Elements and Napier's is even observable in the tables that illustrate the respective works; and if Euler's arrangement had been as purely and philosophically symmetrical as Napier's, (in which circumstance, however, it is far inferior,) his work would almost have seemed a modern translation of the ancient manuscript. If our philosopher were to be any where completely thrown out in the comparison, that might have been expected to occur in Euler's chapter of the Binomial Theorem; yet there I find the latter, after examining the "important question how we may find, without being obliged always to perform the same calculation, all the powers either of $a + b$, or $a - b$," gives the following table as that which discovers the law by which binomial coefficients are formed.

* Dr Wallis, in his Algebra, 1685, reviews Oughtred's *Clavis Mathematicæ*, first published in 1631, (fourteen years after Napier's death,) and in the chapter of the nature and composition of powers, gives a table of powers from Oughtred's work, of which I find the counterpart in Napier's manuscript, but further extended. Napier gives it immediately after his arithmetical triangle, and uses it precisely for the purpose Oughtred did. "From hence," says Wallis, "we may take, without more adoe, the nearest root (quadratick, cubick, &c. respectively,) of any number whose root requires not more than one figure, and the respective power of any such root. But because in extracting the root of great numbers, it will be necessary to seek out the root by piece-meal, (as we do the quotient in division,) he doth afterwards consider the root as consisting of two parts, A + E, (which he calls a *binomial* root,) whereof one part is supposed to be *already known*, (or to be found by the preceding table,) and the other *unknown*, to be found by the following table, which he calls his latter *table of powers*." This latter table is Napier's binomial table; but under the notation of *Vieta*, whose symbolical method, called *specious arithmetic*, was unknown to Napier, and forms an important step in the progress of notation.

There is an old-fashioned, but excellent work, entitled, "A New System of Arithmetick, Theorical and Practical, by Alexander Malcolm, teacher of the mathematics at Aberdeen, 1730," containing a full exposition of the Binomial Theorem, wherein I find a remark that illustrates our philosopher's explanation of his diagram. "These expressions of powers of a *Binomial* root shew us how *the difference betwixt any two similar powers* is composed of the various powers and multiples of any one of the roots, and the difference betwixt the roots," &c.

Powers.	Coefficients.
1st,	1 . 1
2d,	1 . 2 . 1
3d,	1 . 3 . 3 . 1
4th,	1 . 4 . 6 . 4 . 1
5th,	1 . 5 . 10 . 10 . 5 1
6th,	1 . 6 . 15. 20.15. 6 . 1
7th,	1 . 7 .21. 35. 35. 21. 7 . 1
8th,	1 . 8 . 28. 56. 70 . 56 . 28 . 8 . 1
9th,	1 . 9 . 36. 84. 126. 126. 84. 36. 9 . 1
10th,	1. 10. 45 . 120. 210. 252. 210 . 120. 45. 10. 1

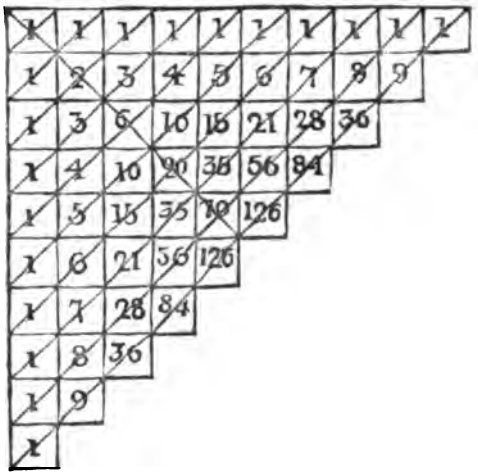
This is Napier's combination with the addition of one row of units on the left side, which is not essential to the construction, the coefficients of the first terms being always 1. From this table Euler proceeds to deduce the Binomial Theorem itself, and concludes his chapter with these words, " this elegant theorem for the involution of a compound quantity of two terms, evidently includes all powers whatever; and we shall afterwards show how the same may be applied to the extraction of roots."

It is obvious from Napier's expressions, " *Tabella nostra triangularis areolis hexagonis referta,*" that his beautiful diagram is perfectly original in his hands. A disposition of numbers upon the same principle, for the extraction of roots, was first conceived by Stifellius in this form.

1							
2							
3	3						
4	6						
5	10	10					
6	15	20					
7	21	35	35				
8	28	56	70				
9	36	84	126	126			
10	45	120	210	252			
11	55	165	330	462	462		
12	66	220	495	792	924		
13	78	286	715	1287	1716	1716	
14	91	364	1001	2002	3003	3432	
15	105	455	1365	3003	5005	6435	6435
16	120	560	1820	4368	8008	11440	12870
17	136	680	2380	6188	12376	19448	24310

Stevinus has also considered this figurate table and its properties; but, from what has been already remarked on the subject of Decimal fractions, it seems certain that Napier wrote his arithmetic before the work of Stevinus was published, or, at least, be-

fore he had seen it. I think it is equally certain that he had never seen the *Arithmetica Integra* of Stifellius.* While he praises the former author in Rabdologia, I cannot find that he any where mentions the latter, whose very curious work, however, must have excited his warmest admiration had he met with it. The celebrated *Blaise Pascal*, one of the most profound minds ever created, has in more modern times obtained the highest praise for his *Arithmetical Triangle*, which, as the reader will easily perceive from the following diagram of it, is just Napier's table under a less beautiful form.



Montucla, in his History of Mathematics, refers to it in these words; " Quelques questions sur les jeux l'engagèrent (Pascal) à approfondir les combinaisons, et ses meditations sur ce sujet donnerent lieu à l'invention de son *triangle arithmetique*, au moyen duquel il résoud divers problêmes sur cet objet. Il écrivit sur cette matière un traité qui paroît avoir été achevé vers 1653, quoique imprimé seulement en 1665. Les usages de ce triangle arithmétique sont nombreux, et c'est une invention *vraiment originale et singulièrement ingénieuse*." The properties of this triangle are so intimately connected with the Binomial Theorem that Bernoulli, on that account, claims for Pascal the merit of being its first inventor. In his annotations upon a work of Mr Stone, upon the infinitesimal analysis, where the latter speaks of " that marvellous theorem," Bernoulli notes, " *Pour l'elevation d'un binome à une puissance quelconque.* Nous avons trouvé ce merveilleux theorême aussi-bien que Mr Newton, d'une maniere plus simple que la sienne. Feu M. Pascal *a été le premier* qui l'a inventée." (*Johan. Bernoulli Opera*, iv. p. 173.) Baron Maseres (*Scriptores Logarithmici*, Vol. iv.) republished Pascal's works on Arithmetic and Algebra, and says, " These works are so full of genius and invention, that I thought I should do a service to the mathematicians of Great Britain, by republishing them in

* Dr Minto acutely observes, " Not only Napier's manner of conceiving the generation of the Logarithms, but his having computed that species of Logarithms which has been described, before the common Logarithms occurred to him, is *a convincing proof* of his not taking the Logarithms from the remark of Stifellius."

this collection. Some of them, and more especially his *Arithmetical Triangle*, have a considerable connection with Logarithms, by affording a good demonstration of Sir Isaac Newton's Binomial Theorem in the case of integral and affirmative powers, which is of great use in the construction of Logarithms." Very probably the invention was original in Pascal's hands, and the application to games of chance seems entirely his own. It is a curious fact, that Napier's friend, Henry Briggs, to whom the manuscript we are considering is addressed, did also, in his *Trigonometria Britannica*, give a table of the same description; and Dr Hutton, when noticing this work in his History of the Construction of Logarithms, has accordingly claimed the Binomial Theorem for Briggs. He says, after giving some account of the table and its properties, "this is the first mention I have seen made of this law of the coefficients of the powers of a binomial, *commonly called* Sir Isaac Newton's Binomial Theorem, although it is very evident that Sir Isaac was not the first inventor of it; the part of it properly belonging to him seems to be only the extending of it to fractional indices, which was, indeed, an immediate effect of the general method of denoting all roots like powers with fractional exponents, the theorem being not at all altered," &c. Briggs' table, which he called *Abacus* Παγχρηστος, is in this form, only carried further on.

ABACVS ΠΑΓΧΡΗΣΤΟΣ.

H	G	F	E	D	C	B	A
—(8)	—(7)	+(6)	+(5)	—(4)	—(3)	+(2)	(1)
1	1	1	1	1	1	1	1
9	8	7	6	5	4	3	2
45	36	28	21	15	10	6	3
165	120	84	56	35	20	10	4
495	330	210	126	70	35	15	5

Notwithstanding the many long and delightful discussions that must have passed between Henry Briggs and the Baron of Merchiston upon their favourite topics, there seems no ground for alleging that the former had borrowed his idea from his illustrious friend. We have elsewhere ventured to call him a satellite of Napier's, and fairly enough, as his memory is chiefly logarithmic, and his persevering pilgrimages to the old tower in Scotland is an ample justification of the epithet. But Briggs has evinced in his two logarithmic works a mind capable of great mathematical conceptions. * In reference to the arithmetical triangle, he appears to have been the first to point out a

* The kind assistance of an Oxford friend enabled me to ascertain, with tolerable certainty, that there are no traces among Briggs' papers, preserved at that university, of a correspondence between him and Merchiston; probably he found the Baron a better host than a correspondent. Among Briggs' papers in the British Museum, there is one entitled *Imitatio Nepeirea, sive applicatio omnium fere regularum, suis Logarithmis pertinentium, ad Logarithmos*, supposed to have been written immediately after the publication of the *Canon Mirificus*.

particular law of that configuration which brought him as close to the Binomial theorem as the notation of his day rendered possible. The passage is remarkable, and as his work is rarely to be met with, I shall give it here. "*Numerus quilibet est ad suum Diagonalem, ascendendo versus sinistram, ut verticalis primi ad Marginalem secundi. Numeri in Columna A sunt ad suos Diagonales in B ascendendo, ut 2. ad Marginalem secundi. Hinc sequitur numeros margini dextro adjacentes, reliquosque deinceps proximos, posse inveniri et continuari quo usque visum fuerit; licet totus Abacus a Capite non sit adscriptus.*" I have looked anxiously, but in vain, through Napier's manuscript to discover some expressions indicative of his observation of this important law of proportion actually existing in the table he had formed. There is, however, no question that his triangle is what would be now called *a table of coefficients of the powers of a binomial*, which he framed for its most important application, that of extracting roots. In doing this he was certainly at the confines of the Binomial Theorem. Had he only recorded the observation of Briggs, it must have been admitted that he had actually *stated* the leading principle of that elegant theorem, which is engraved upon the tomb of Newton as one of the greatest of his discoveries. The observation, which leaves that laurel with Briggs, (and which Napier may have seen, though he did not state it,) amounts to this, that, by a certain law of proportion existing betwixt the figures of the diagram, which law he points out, all the terms of the binomial quantity could be successively deduced, or raised, from the second term (the coefficients of the first and second terms being always known,) without the necessity of finding the intermediate and preceding powers. The *application* of this law (which Briggs verbally stated) is that algebraic generalization of the principle of Napier's triangle which supersedes the necessity of actually composing the whole table in order to obtain the terms and successive powers of a binomial root; and upon the strength of Briggs' observation of that law Dr Hutton claims the Binomial Theorem for him, certainly with better reason than Bernoulli does for Pascal. But the value of it is really dependent upon a play of symbols not known in the time either of Napier or Briggs. What was necessary in order to make the property, which the latter unquestionably pointed out, a valuable extension of the arithmetical triangle, was to have the means of stating it in this form, $1 \times \frac{m-0}{1}, \times \frac{m-1}{2}, \times \frac{m-2}{3}$, &c. being Sir Isaac Newton's genesis of the binomial powers in question. So far, indeed, the Prince of Mathematicians only made the *algebraic application* of the principle of the figurate table in the case of *integral* quantities, to which alone the triangle is applicable. But Dr Hutton, probably for the sake of planting so fine a laurel upon the brow of Briggs, seems inclined to slur over a most important extension of the Binomial Theorem, when he says, "Sir Isaac was not the first inventor of it, the part of it properly belonging to him seems to be *only the extending of it to fractional indices*, which was, indeed, an immediate effect of the general method of denoting all roots like powers with fractional exponents." True it was an improved notation that led Newton to consider the theorem as he did, and moreover, to expand it into an infinite algebraic series, which, without that notation, it were impossible to have done; but in this it was, that, to use the phrase

of his last biographer, Newton must be acknowledged as "the General who won the victory, and therefore wears the laurels." In his hands the binomial table of Stifellius, Napier, Briggs, and Pascal (each one of whom appears to have invented it) was expanded into the Binomial Theorem *par excellence*. What he did beyond his predecessors is somewhat analogous to Napier's merit when he generalized the logarithmic principle (previously observed by Archimedes, Stifellius, and others,) into a system of universal application and omnipotent power. In that comparison, however, the important distinction must be kept in view, that Newton's generalization of the table of coefficients was forced upon the attention of such a mind by the then ripened doctrine, and notation, of powers and exponents, the very medium through which, in like manner, he must have detected the Logarithms. Napier, on the other hand, instead of using that means to extend the principle of Archimedes into a system of *common* Logarithms, and before such means was in existence, took a totally different path of his own construction, and tore the veil from a *transcendental* system of Logarithms, thus disclosed, as it were, before its time.

Although the Binomial Theorem is "so very closely connected with the subject of Logarithms as to be the foundation of the best methods of computing them," (*Maseres*,) and although our philosopher approached the confines of it in his beautiful diagram, (a form perfectly original,) these circumstances must not be supposed to connect with his great invention. In that path he could do nothing without algebraic notation, which in his day was totally inadequate for such refined purposes. The analytical language may be said to have first dawned in the works of *Vieta*, which only commenced to be spread abroad, and to give an impulse to science after Napier's career was closed. It is of consequence, then, to see if, in the manuscript we are considering, there be any indications that Napier felt the trammels of a rude notation, and struggled to remove them. As his system of numbers was never finished, and is only now first noticed to the world, of course what he did in this manuscript can form no link in the progress of science, and can be only referred to in further illustration of the mind that invented the Logarithms. But it will be acknowledged, by all lovers of science, to be a very striking and interesting circumstance, if, as we shall immediately show to have been the case, Napier not only determined to become the liberator of the numerical scale, but had turned his powerful mind to algebraic notation, with the same premeditated intention of reforming that. I am not aware that any writer before his time had made the systematic attempt now to be noticed. Immediate necessity, and accidental ingenuity, added very sparingly to the abbreviated language of algebra during the period between its introduction into Europe and when Napier commenced a work of extreme beauty and high conceptions, which, had he published it, even in its unconcluded state, must have given a decided impulse to science, and Britain a distinguished place in the history of Algebra, independently of the Logarithms.

In his consideration of radical partition, and extraction of roots, Napier did not fail to observe, most profoundly and successfully, a species and property of numbers exceedingly curious, and of high importance in the science. The quantities alluded to are the

roots of those numbers whose roots cannot be *numerically* expressed; and for this reason, that a root is that quantity which is contained in another quantity any number of times *exactly*, *i. e.* without a remainder less than the root itself; and there are some numbers that contain no number whatever any number of times without a remainder. An ordinary mind might be apt to conceive that such quantities had no roots, according to the definition of that term. Mathematicians have decided otherwise. The roots lurk in those quantities, though they cannot be extracted; they may be hunted into a corner, but they cannot be caught; or, to use Napier's expressions with regard to them, they may be *named*, but they cannot be *numbered*. Having decided that such latent quantities have a real existence, mathematicians, of course, will not suffer them to remain in idleness, or unsubjected to the dominion of science. They have been called irrational quantities or surds, and hence the *arithmetic of surds* has become a special and important department of numbers. No man before or since his day, knew better how to hunt a surd than John Napier. He was thoroughly master of their whole philosophy, and the manuscript before me contains, perhaps a more beautiful and complete exposition of their arithmetic than has ever been published. Consequently, this very curious property had not escaped him, that a surd root, though it cannot be expressed in finite number, lies between two other numbers that can be so expressed, and whose terms can be brought closer and closer to each other by *infinite* approximations, without, however, being capable of catching the latent surd. To give an easy example,—the square root of 9 is 3, because 3 times 3 is 9; but what is the square root of 10? In other words, what is the number which, multiplied by itself, makes 10? Not 3 times 3, that is too little; nor 4 times 4, that being too much. But the doctrine of fractions enables us to express numbers betwixt 3 and 4, and, consequently, nearer to each other than these. The approximations, however, are still found to be terms, the one too great, and the other too small, to express the surd sought; and the curious property is, that the fractional terms may be brought closer and closer together by an endless approximation, and still the surd shall be latent between them. Thus the actual existence of the quantity is ascertained, but it can only be expressed by two separate finite terms indicating its position, or by some special symbol invented to represent it. Now it was to the notation of these surds that Napier, in that department, first turned his attention, as such quantities seemed peculiarly dependent upon a symbolical notation. The notation he proposed was never published; and I shall premise the translation with some notices of the state of irrational expressions after his day, and, indeed, as it exists now.

Dr Wallis, the great contemporary of Newton, in his Algebra already quoted, after explaining the nature of a surd root, adds, "in such case we must either content ourselves with an approximation instead of the accurate value, or else with such note of radicality as shall intimate what is supposed to be, but cannot accurately be expressed in numbers. As $\surd 2$, or $\surd q\, 2$, the square root of the number 2. $\surd c\, 3$, the cubick root of the number 3. Which supposed roots, thus designed, cannot in numbers be accurately expressed, there being no effable number, integer or fraction, which, being mul-

tiplied into itself, can make 2; or, being cubically multiplied, can make 3." Euler, in his Algebra, says, "there is a sort of numbers which cannot be assigned by fractions, and which are, nevertheless, determinate quantities; as, for instance, the square root of 12; and we call this new species of numbers *irrational numbers;* they occur wherever we endeavour to find the square root of a number which is not a square; thus, 2 not being a perfect square, the square root of 2, or the number which, multiplied by itself, would produce 2, is an irrational quantity; these numbers are also called *surd quantities*, or *incommensurables*. These irrational quantities, though they cannot be expressed by fractions, are, nevertheless, magnitudes of which we may form an accurate idea; for, however concealed the square root of 12, for example, may appear, we are not ignorant that it must be a number which, when multiplied by itself, would exactly produce 12; and this property is sufficient to give us an idea of the number, since it is in our power to approximate towards it value continually. As we are, therefore, sufficiently acquainted with the nature of the irrational numbers under our present consideration, a particular sign has been agreed on to express the square roots of all numbers that are not perfect squares; which sign is written thus $\surd$, and is read the *square root*." A great improvement, however, in this notation became established between the time of Wallis and Euler, and that was to express the number of the root, or the order of the power, by a numeral index placed within the radical sign, instead of the cumbrous repetition of initial letters. Besides this improvement there is a more modern alternative notation of surd roots. Euler, in his chapter "of the method of representing irrational numbers by fractional exponents," shows "that $a^{\frac{1}{3}}$ is the same as $\sqrt[3]{a}$," and so on; and then he adds, "we might therefore entirely reject the radical signs at present made use of, and employ in their stead the fractional exponents which we have explained; but as we have been long accustomed to those signs, and meet with them in most books of algebra, it might be wrong to banish them entirely from calculation; there is, however, sufficient reason also to employ, as is frequently done, the other method of notation, because it manifestly corresponds with the nature of the thing." It must also be observed, that, notwithstanding "the rule, that we must adhere to one notation for one thing," the radical notation in question has not been exclusively devoted to the same species of quantity. Euler, in his chapter "of roots, with relation to powers in general," and, speaking of *rational* roots, takes occasion to exhibit the different roots of the number a, with their respective values.

$$\left.\begin{matrix}\surd a\\ \sqrt[3]{a}\\ \sqrt[4]{a}\\ \sqrt[5]{a}\\ \sqrt[6]{a}\end{matrix}\right\} \text{ is the } \left\{\begin{matrix}\text{2d}\\ \text{3d}\\ \text{4th}\\ \text{5th}\\ \text{6th}\end{matrix}\right\} \text{root of } \left\{\begin{matrix}a\\ a\\ a\\ a\\ a \text{ and so on,"}\end{matrix}\right.$$

being the same radical signs that are taken to express surds. Thus it appears that even at present the notation of such irrational quantities is not of a very determined character; but, in the first place, possesses an alternate mode of expression; and, in the second place, a set of radical signs, shared in common with an opposite species of quantity. We may now turn to Napier's consideration of this subject in which we shall find, as usual, the most unequivocal proofs of his original and penetrating genius.

In the fourth chapter of his first book, our philosopher, after explaining the genesis of a surd root, and of the approximating terms between which it lurks, (*see supra*, p. 467,) adds, "but geometricians, studious of greater accuracy, choose rather to prefix the sign of the index to the radicate itself, than to include the root between two terms; thus they note the tripartient root of nine in this manner, $\surd c\,9$, which they pronounce the *cube* root of nine. I, however, note it thus, $\lfloor\_\ 9$, and call it the *tripartient* root of nine; these signs I shall discuss more fully in their place." In the ninth chapter of his second book, entitled, "Of the method of amending imperfect extractions," our philosopher enters minutely into the subject of the approximating fractional terms, and teaches how to express an irrational root with the least sensible error. "So that," to take the result of one of his examples, "without any sensible error, especially in practical science (*in mechanicis*,) the bipartient root of 164860 may be called $406\frac{94}{813}$, or $406\frac{94}{812}$." He afterwards observes, "these methods, as they do not make imperfect roots perfect, but merely render them less imperfect, are more pleasing to practical men (*mechanicis*) than to mathematicians, as I have noticed in *C. iv. Lib. i.* Geometricians, therefore, prefix the appropriate sign of the root to such radicates as have no roots in numbers. Hence, from the radicates with these signs prefixed, arises the first species of geometrical numbers, called *uninomes*. As in the above example of the duplicates 164860 and 50, they neither extract the bipartient roots, because they possess none precisely in numbers, nor do they amend the imperfect extraction; but they prefix to the number the sign of the root to be extracted, which they call the square root (*quadratam*,) thus, $\surd$ Q 164860, and $\surd$ Q 50, or thus, $\surd q$ 164860, and $\surd q$ 50, which they pronounce the square root of the number 164860, and the square root of the number 50. I, however, note them thus, $\lfloor\rfloor$ 164860, and $\lfloor\rfloor$ 50; and pronounce them the bipartient root of 164860, and the bipartient root of 50. So the tripartient root of the number 998 they neither extract, as it is not in numbers, nor amend, but thus note, $\surd$ c 998, and pronounce, the cube root of 998. I, however, note it thus, $\lfloor\_$ 998, and pronounce it, the tripartient root of 998, as I shall discuss more amply in its place. However, these are called *uninomia*, or *medialia*, and are the foundation of *Geometrical Logistic*. They shall be treated of, therefore, in the following book; here it is sufficient to have pointed out their origin."*

In order to connect this subject, I shall pass immediately to the third book here referred to, reserving in the meantime what remains to be noticed of the first. It is entitled, *Liber tertius de Logistica Geometrica*,* *Cap.* i. Unfortunately it is a fragment, being

* I am not aware of a department of science known under that term now. Probably the best explanation of it is that afforded by the fragment itself.

all that his son Robert could find among his papers upon the subject, as he notes at the end of his transcript. It is, however, so original and full of genius that no apology need be offered for giving our readers a literal translation of the whole of it.

" In the preceding book I have taught Arithmetic; here in order follows Geometrical Logistic. The computation of concrete quantities by concrete numbers is called Geometrical Logistic. Thus 3^a, if it relate to three lines, each a finger-breadth (*digitales*) thus, ——— ——— ———, is a *discrete* number. When, however, it refers to a concrete and continuous line of three finger-breadths, such as this ———, it is called a *concrete* number; but this *improperly*, and subject to reason. The roots of numbers which cannot be measured by any number, integral or fractional, are properly, and in themselves, called concrete numbers. Thus the bipartient or square root of seven is greater than two, less than three, and with no fraction in the universal elements of broken numbers is it equal or commensurable; it is therefore properly called a concrete number. So the tripartient, or cube root of the number 10 is not a discrete number, nor commensurable with number, but is concrete; and so are an infinity of other roots of numbers, commonly called surds and irrational numbers (*surdos et irrationales.*) These concretes arise out of the extraction of roots from numbers in which those roots are not seated; as I have already noticed, *C. iv. Sect.* 8, *Lib. i.* and *C. ix. Sect.* 7, *Lib. ii.* Hence, from the variety of roots arise various notations and nominations of concretes. As the bipartient root of seven, which is usually called the *square* root of seven (*quadratam,*) I note in this manner ⌊7, and pronounce the *bipartient* root of seven. So the *cube* root 10, I pronounce the *tripartient* root of ten, and write it thus ⌊ 10. So the *quadripartient* of 11, I note thus ⌉11. So the *quintupartient* of any number, thus, ⌈ ; the *sextupartient* thus ⌊. This single scheme, (*a.*) divided into compartments, (*b.*) with the indices numbered, (to assist the memory,) supplies us with this variety of radical characters. As in the preceding examples, ⌋ ⌊ ⌉ ⌈ ⌊ prefixed to the numbers, denote the bipartient, tripartient, quadrupartient, quintupartient, sextupartient roots; so ⌉ is the septupartient, ⌈ the *octupartient;* ⌈ the *nocupartient;* ⌉° the decupartient; ⌋⌉ the undecupartient; ⌋⌋ the duodecupartient; ⊥ the tredecupartient; ⌋ ⌉, or ⌋⌉ the quadrudecupartient; ⌋⌈ the quindecupartient; ⌊ the sedecupartient; ⌉⌉ the septemdecupartient; ⌈⌈ the octodecupartient; ⌋ the novemdecupartient; ⌋° the vigecupartient; ⌋⌋ $21^{ent.}$ ⌋⌋⌋ $22^{ent.}$ ⌋⊥ $23^{ent.}$ ⌋⌋ ⌉, or ⌋⌋ $24^{ent.}$ *et cetera.* Also ⌊₀ $30^{ent.}$ ⌉° $40^{ent.}$ ⌈° $50^{ent.}$ ⌊₀ $60^{ent.}$ ⌉₀ or ⌉° $70^{ent.}$ ⌈₀ $80^{ent.}$ ⌈° $90^{ent.}$ ⌋∞ $100^{ent.}$, and so on *in infinitum* upon the principle of figurate arithmetic. * " Geometrical numbers, which rather *name* quantity than *number* it, are on that account commonly called nomials (*nomina.*) Of

(*a.*)

(*b.*)

1	2	3
4	5	6
7	8	9

* Napier's notation is written about this size in the manuscript, apparently for the sake of distinctness in teaching; but it would appear that he meant it to be much smaller in practice, as it sometimes is written of a diminutive size, and even attached to fractions, thus $⌋\frac{29}{4}$, and $\frac{⌋\,29}{⌋\,4}$.

nomials some are *uninomials*, others *plurinomials*. A uninome is the same as a single concrete number, proper or improper. Hence it follows that a uninome is either a single simple number, or any root of a single simple number. Thus 10 is a simple number, and, by geometricians, in frequent use as a uninome. So ⌊⌋ 10, ⌊_ 12, ⌐⌋ 26, and such like, are roots of numbers, and, when taken by themselves, are truly uninomial radicates.

" Now, since it is the case that a uninomial *radicate* may be the *root* either of an *abundant* or *defective* number, and its index may be either *even* or *odd*, from this fourfold cause it follows, that some uninomes are abundant, some defective, some both abundant and defective, which are called double, and, finally, some are neither abundant nor defective, which are called imaginary (*nugacia.*) I have already (Lib. i. C. vi.) laid the foundation of this *great algebraic secrete;* and although never, that I know of, *hitherto revealed by any one*, how much it will enrich this art and the rest of the mathematics, shall afterwards be manifest. *

" In abundant and defective uninomes, it is not of much consequence whether the appropriate sign be prefixed or interposed; it is better, however, to prefix it. But in double and imaginary uninomes, the appropriate sign must be always interposed. An example of the first case is ⌊_ 10, or (which by C. vi. Lib. i. is the same thing) ⌊_ + 10, an abundant uninome. An example of the second case is ⌊_ — 10, a defective uninome. An example of the third case is ⌊⌋ 10 or ⌊⌋ + 10, (being, as above, the same,) which

* This certainly has no connection with the Logarithms, and most probably refers to some of those profound views in algebra, and the theory of equations, which compose the triumphs of subsequent philosophers. Unfortunately, the algebraic part of the manuscript is not entire; but from what has been preserved, it is quite obvious that Napier was capable of any thing in that science, so far as the existing notation made it possible for him to advance. Without attempting to say what Napier here particularly contemplated, (which I leave for the learned,) some interesting illustrations of what he actually lays down may be derived from the history of algebra. It must be kept in mind, that what he calls *abundant* and *defective* quantities are now known under the terms *positive* and *negative;* (*supra*, p. 469, &c.;) as for *imaginary* quantities, I am not aware that any one before the date of this MS., or for long after it, was so bold or profound as to give them their important place in calculation. Accordingly Playfair, speaking of *Girard*, in the passage already quoted as to quantities less than nothing, (*supra*, p. 469,) whose *Invention Nouvelle en Algèbre* was printed in 1629, says, " the same mathematician conceived the notion of imaginary roots." Dr Hutton observes, " Albert Girard gives names to the three kinds of roots of equations, calling them greater than nothing, less than nothing, and *envelopée*, as $\sqrt{-bc}$; but this was *soon after called imaginary or impossible*, as appears by Wallis' Algebra, p. 264, &c." Yet we find that Napier considered, and was expounding, such quantities, in their philosophy, nomenclature, and notation. So much is this the case, that a great part of Euler's 13th chapter " of impossible or imaginary quantities" may stand, as usual, for a translation of Napier's discussion of the same subject. The passages are too long to quote; but any one who takes an interest in the history of algebra, or the genius of Napier, will be struck with the similarity betwixt that chapter of Euler and what we have quoted at p. 471 from our philosopher's manuscript, and also above. Euler even adds the same warning against confounding the radical signs: " We must not," he says " confound the signs + and —, which are before the radical sign $\sqrt{}$, with the sign which comes after."

signifies both an abundant quantity multiplied into itself, and yielding + 10, and also a defective quantity multiplied into itself, and yielding + 10; or, for the sake of a more lucid example ⌊⌋ 9, or ⌊⌋ + 9 is as much + 3 as — 3, according to what I have already demonstrated, *Lib. i. C. vi.* An example of the last case is ⌊⌋ — 9, which is merely imaginary, and signifies nothing that either abounds or is deficient, for *defective nine* has no bipartient root, as is made plain in *Lib. i. C. vi. s. b.*

" In imaginary quantities special care must be taken that the sign *minus* —, to be *interposed*, be not *prefixed*. Thus, if for ⌊⌋ — 9, which is the bipartient root of *minus* nine, *(minuti novenarii,)* and infers an absurd and impossible quantity, there be taken — ⌊⌋ 9, which signifies a quantity *less by the square root of nine*, a great mistake will be committed; for the bipartient root of nine, here abundant, namely, ⌊⌋ 9, is double; that is, + 3 and — 3; and therefore, a quantity *minus* these geminals + 3 and — 3 will be geminal; so that whoever for ⌊⌋ —9 writes — ⌊⌋ 9, puts forth a quantity of a geminal, or double signification, instead of a quantity absurd, impossible, imaginary, and of no signification (*absurdo, impossibili, nugaci et nihil significante.*) Take care, then, of such prevalent confusion.

" In all other uninomes (significant that is) it is the same thing whether the copulative sign be placed between the radical sign (*signum radicale,*) and the number, or prefixed to both; nor does it change the value of those uninomes to place the sign + before them or in the middle. Thus ⌊⌋ 9, and ⌊⌋ +9, and + ⌊⌋ 9, and + ⌊⌋ +9, are all precisely the same, namely, as much + 3 as — 3. So ⌊ 27, or ⌊ + 27, or + ⌊ 27, or + ⌊ 27, have the same value as + 3 only. So ⌊ — 27, or + ⌊ — 27, or — ⌊ 27, or — ⌊ + 27, have the same value as — 3 only. So in imaginary quantities, ⌊⌋ — 9 and + ⌊⌋ — 9 signify the same, as they both imply the same impossibility. But *take care* not to write in their stead —⌊⌋9 or —⌊⌋+ 9, as in the preceding section I have admonished.

" So much for the affections of uninomes in themselves. The next consideration is the manner in which they stand affected to each other. Two uninomes (*uninomia bina*) are either commensurable with each other, or incommensurable. Those are commensurable which are to each other as discrete or absolute numbers. Hence every absolute number is commensurate with every absolute number. Moreover, two uninomes radicated alike, [*consimiliter radicata, i. e.* raised to the same power, or whose indices are alike,] of which the one simple number, when divided by the other, yields a number possessing such a root as the radical sign indicates, are said to be commensurable with each other in the ratio that the root indicates. Thus 5 and 7 are commensurable, because they are absolute or rational numbers. So, of the two uninomes radicated alike ⌊⌋ 8 and ⌊⌋ 2, if the simple number 8 be divided by the simple number 2, the quotient is 4. Now the number four has a root whose sign is ⌊⌋, that is to say, bipartient, and it is the number 2. Therefore ⌊⌋ 8 and ⌊⌋ 2 are commensurable with each other in the ratio of the root, which is as two to one. Consequently, all other uninomes which cannot be reduced to this are incommensurable. Thus ⌊ 12 and ⌊⌋ 3, because they are differently ra-

dicated, are incommensurable. So ⌊⌋ 6, et ⌊⌋ 2, (although radicated alike,) are incommensurable, because 6 divided by 2 produces 3, which wants the root whose sign is ⌊⌋, that is, the bipartient. But 12 and ⌊⌋ 4 are commensurable, because when reduced they are equivalent to 12 and 2, &c."

"*I could find no more of his geometricall pairt amonst all his fragments.*" *

I now return to the concluding chapters of Napier's second book, of which it is only possible here to give a hurried and imperfect view. Having in the 6th, 7th, 8th, and 9th chapters disposed in the most brilliant manner of involution and evolution, our philosopher, never losing sight of perfect symmetry in his arrangement, again takes up, in chapter 10, the rules of proportion of integers. Referring to those already given in his first book, he now expounds several particular and compendious rules of proportion, of which one example may be selected, as being characteristic of the constant war he waged against the tyranny of *derivative* computation.

"There is," says he, "another compendious method without the omission of figures. Let all the given numbers of the question be arranged in their proper places above and below the line, as I have expounded in the general method proposed in *C. v. Lib. i.* Then let each of two numbers, one above the line, as if numerator, and the other below the line, as if denominator, be divided by the greatest common divisor until each of the numerators shall be to each of the denominators in the first or least ratio to each other, all the last quotients being noted. Finally, let the multiple of all the upper quotients be divided by the multiple of the lower quotient; this quotient will be the answer sought, and solve the question. Thus, if 4 builders construct a wall 6 feet high and 48 ells long in 42 days, it is demanded, in how many days will 5 builders erect a wall 9 feet high, and 50 ells long? Let all the numbers be arranged according to the rule laid down in *C. v. Lib. i.* and they will stand as on the margin. Then abbreviate the upper number 4, and the lower number 6, by 2, the greatest divisor, which gives $\frac{2}{3}$ in this form $\frac{2 \cdot 9 \cdot 50 \cdot 42}{3 \cdot 3 \cdot 48}$. Then divide 2 above, and 48 below, by the common divisor 2, which gives 1, and 24, in this form $\frac{1 \cdot 9 \cdot 50 \cdot 42}{3 \cdot 3 \cdot 24}$. Then divide 9 and 3 by 3, which gives 3 above and 1 below, in this form $\frac{1 \cdot 3 \cdot 50 \cdot 42}{3 \cdot 1 \cdot 24}$. Then divide 50 and 5 by 5, which gives 10 above and 1 below, in this form $\frac{1 \cdot 3 \cdot 10 \cdot 42}{1 \cdot 1 \cdot 24}$. Then divide 10 and 24 by the greatest common divisor 2, which gives 5 above and 12 below, in this form $\frac{1 \cdot 3 \cdot 5 \cdot 42}{1 \cdot 1 \cdot 12}$. Finally, divide 42 and 12 by the greatest common divisor 6, which gives 7 above and 2 below in this form, $\frac{1 \cdot 3 \cdot 5 \cdot 7}{1 \cdot 1 \cdot 2}$. So you now have the familiar and tractable numbers 1 . 3 . 5 . 7 . and 1 . 1 . 2 . to be multiplied together, instead of the given numbers, which were somewhat bigger. Let, then, 1 . 3 . 5 . 7 be multiplied into each other, which gives 105; let the same be done with the lower numbers 1 . 1 . 2 . which gives 2, by which divide 105, and the

Ædific.	Pedes.	Ulnæ.	Dies.
4	9	50	42
5	6	48	quot dies.

* Note by Robert Napier, addressed to Henry Briggs.

quotient will come forth 52½, being the number of the days, satisfying the question without great and laborious multiplications and divisions."

The five remaining chapters of this book, namely, the 11th, 12th, 13th, 14th, and 15th, are devoted to the arithmetic of fractions, the general rules of which have been already given. He carries them minutely through all the operations of addition, subtraction, multiplication, involution, evolution, and rules of proportion. It would occupy too much space to give any thing like a satisfactory abstract of these operations, in which the elegant and profound character of the work is completely sustained. This must again be observed, however, that his division of the subject of fractions clearly intimates, that at this time Napier had not considered decimal fractions as a distinct department. He says, "of fractions, some are called *vulgares*, others *physicæ*." He defines vulgar fractions as those "whose denominators are various and free; as, one-half, two-thirds, four-elevenths, &c." He then explains that "the denominator is that which *names* into how many equal parts unity is distributed; the numerator is that which *numbers* how many of these parts are taken; the numerator is pronounced in *cardinal* number, the denominator in *ordinal*, the numerator *above* the line, the denominator *below*." He then refers to the fractions of fractions, and his own method of noting them; "there are some improper fractions, he says, which are not expressly a part or parts of unity, but are the parts of fractions; and these are called fractions of fractions. *I note them by interposing the particle* ex; *others note them by omitting the line or lines of the posterior fractions.* Thus, two-fifth parts of three-fourth parts I note $\frac{2}{7}$ ex $\frac{3}{4}$; others note them thus, $\frac{2}{7}$ $\frac{3}{4}$," &c. *

Napier defines physical fractions, "the part or parts of a whole, divided by some appointed and commonly received divisor, which its authors put in the place of denominator. Thus it hath pleased *our mint-masters* to divide the pound of money, not into what number of parts you will, but into 20 parts, and to put shillings in the place of denominator; so the Apothecaries divide the pound weight into 12 parts, which they name ounces, an ounce into 8 drachms, a drachm into 3 scruples, &c.; Chronologists divide the year into 12 months, the months into 30 days or thereabouts, the day into 24 hours, &c.; Astronomers divide the degree into 60 prime scruples or minutes, the primes into 60 seconds, the seconds into 60 thirds, &c." But Napier nowhere, in all his minute exposition of fractions in this work, refers to the system of decimals. The chapter of physical fractions closes his book of arithmetic, the last sentence of which must not be omitted,—"And now to God, the Father Almighty, and in all His Numbers, infinite, immense, and perfect, be ascribed all the praise, honour, and glory, for ever and ever. Amen. *Finis.*"

Napier, in the first chapter of his Arithmetic, refers to Geometrical Logistic as the subject of his third book, (the fragment already given,) and to Algebra, as treated of in his fourth book. It would appear, however, that although he has also left a manuscript treatise on Algebra, it is an earlier production than what we have been considering.

* "Compound fractions are fractions of fractions, and consist of several fractions connected together by the word *of;* as $\frac{2}{3}$ of $\frac{3}{4}$, or $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$."—*Hutton's Math. Dict.*

This is manifest from several circumstances. 1. It is entitled, "The Algebra of John Naper, Baron of Merchistoun," but not *liber quartus*, in correspondence with the other books. 2. Arithmetic is referred to in it; but there is no reference to his own book of Arithmetic, as unquestionably (according to his practice throughout the rest of the manuscript,) there would have been had that existed at the time. 3. This treatise is itself divided into two books; and while there is a systematic reference to its component parts, there is none whatever to the treatise we have considered. 4. Napier adopts in his Algebra the radical *nomination* and *notation*, which in the other treatise he had superseded by a superior system of his own; and there is here no reference to his peculiar notation of surds. There can be little doubt, therefore, that, although what we have reviewed was written before he had conceived the Logarithms, this treatise is a still earlier production. From the circumstance, however, that Robert Napier has paged the two books of Algebra continuously with the rest, it is probably that they are so much of what the philosopher intended to compose the fourth book, to which he alludes. Yet it is singular that there is no appearance of crude or youthful composition in this his earliest work. It is stampt with the same characteristics of simple exposition, profound views, and symmetrical arrangement as all his other productions. Our limits will not enable us to do it justice; but some extracts from the first chapter, which he entitles, "of the definitions, the divisions of the parts, and the vocabulary of the art," will afford an interesting specimen, and also evidence that his Algebra was written prior to his arithmetic.

"Algebra is the science which treats of solving questions of magnitude and multitude. It is twofold; the one part regards *nominate* quantities, the other *positive*. Nominate quantities are named from numbers, rational or irrational. Rational numbers are either absolute numbers, or fractions, of which arithmetic also treats. Irrational numbers are roots of those rational numbers which have no roots in numbers; and these, *as they are quantities*, also belong to geometry. The *positive* part of algebra is that which explicates quantities and numbers through the medium of fictitious suppositions, and of which I shall treat in the second book. In this first book I shall teach the first part of algebra, concerning nominate numbers and quantities. There are three species of nominates; *uninomia*, *plurinomia*, and *universalia*. Uninomia are either a single simple number, or any root of a single simple number. But the roots of numbers are various; therefore, for the sake of art and learning, they are expressed by characters prefixed, called radical signs (*signa radicalia*,) and noted thus:—

$\surd$ Q, - *radix quadrata.*
$\surd$ C, - *radix cubica.*
$\surd$ QQ, - *radix quadrati quadrata.*
$\surd$ Ss, - *radix supersolida.*
$\surd$ QC, - *radix quadrati cubica.*
$\surd$ SSs, - *radix secunda supersolida.*
$\surd$ QQQ, - *radix quad. quad. quadrata.*
$\surd$ CC, - *radix cubi cubica. et sic de cæteris in infinitum.*

Our philosopher then minutely expounds the various compositions and combinations of these radical signs and quantities, with their relations to each other. In the second chapter he commences their arithmetical operations with "addition of uninomes;" and thus, in seventeen chapters, which compose this first book, he gives the most beautiful treatise on the arithmetic of surds perhaps ever written. His leading arrangement is always *genealogical*. He shows how *uninomes* are born of the extraction of roots that have no roots of numbers, of which his first part treats,—how, from the addition and subtraction of uninomes that are incommensurable arise *plurinomes*, of which his second part treats,—and how, from the extraction of the obscure roots of plurinomes arise *universals*, of which the third and last part treats; and then he adds, "so in like manner from universals arise universals of universals, and from these again others *ad infinitum universalissima*, the art of which, should it require to be practised, which rarely happens, may easily be gathered from what has been laid down."

Napier's second book, entitled "of positive or cossic algebra," commences, like the last, with definitions, divisions, and a vocabulary. He defines the positive part of algebra to be that which "discloses, by means of feigned suppositions, a true quantity and true number sought." He defines *suppositions* or *positions*, "certain fictitious symbols attached to unity, which, in the place and on the part of quantities and numbers *unknown*, we add, subtract, multiply, and divide. Positions and the symbols of positions are as various and dissimilar as the unknown quantities which the question embraces. Their figures and names are, *ex. gr.* 1 ℞, which is pronounced *one first position*; 1 *a*, pronounced *one a*, or *one second position*; 1 *b*, *one b*, or *one third position*, and so on through the rest of the alphabet." These symbols compose what our philosopher calls "things first in order." He then proceeds to deduce the successive orders [*i. e.* powers] *in infinitum* by the involution of these symbols, and illustrates his exposition by the following table:

Numeri ordinum. 0	Characteres et exempla ordinum primæ positionis.		Characteres et exempla ordinum secundæ positionis.		Characteres et exempla ordinum tertiæ positionis.		&c.
1	1 ℞	3	1 *a*	2	1 *b*	4	
2	1 Q	9	1 *a* Q	4	1 *b* Q	16	
3	1 C	27	1 *a* C	8	1 *b* C	64	
4	1 QQ	81	1 *a* QQ	16	1 *b* QQ	256	
5	1 S*s*	243	1 *a* S*s*	32	1 *b* S*s*	1024	
6	1 QC	729	1 *a* QC	64	1 *b* QC	4096	
7	1 SS*s*	2187	1 *a* SS*s*	128	1 *b* SS*s*	16384	&c.
8	1 QQQ	6561	1 *a* QQQ	256	1 *b* QQQ	65536	
9	1 CC	19683	1 *a* CC	512	1 *b* CC	262144	
10	1 Q S*s*	59049	1 *a* Q S*s*	1024	1 *b* Q S*s*	1048576	
11	1 SSS*s*	177147	1 *a* SSS*s*	2048	1 *b* SSS*s*	4194304	
12	1 QQC	531441	1 *a* QQC	4096	1 *b* QQC	16777216	
13	1 SSSS*s*	1594323	1 *a* SSSS*s*	8192	1 *b* SSSS*s*	67108864	
	&c.		&c.		&c.		

"In this table," he says, "I have supposed, for example's sake, that 1 ℞ is equivalent to 3, 1 *a* to 2, and 1 *b* to 4; which being given, the values of the successive orders follow, necessarily, as noted."

The symbolical language and applications of algebra have undergone so great a revolution since Napier wrote, that to give a sufficiently illustrated analysis of the whole of this part of his work would occupy more space than we can afford. It is rich in definitions, and he leaves no step in his progress unexplained. He uses figures for the *known* quantities, the universal literal system having been introduced at a later period. We see from the preceding table and nomenclature, that the *unknown* quantities he classed in *positions*, and called *positives*, or *things*, which last term is not strange in the history of algebra, the science having been called by the Italian authors *Regola de la Cosa*, or *Rule of the thing*, which is also the derivation of the term *cossic*. From the second chapter to the eighth inclusive, Napier proceeds, in his usual minute and symmetrical manner, through the whole arithmetic of the cossic art. In chapters ninth and tenth he enters upon the *theory of equations*, one of the most important and complicated departments of analytical science, and in which he is far before the algebra of the period when he composed this treatise. How little was it ever suspected that the algebraic triumphs of Vieta, Harriot, and Girard, whose principal works were not known to the world for many years after the date of this manuscript, were some of them actually in the possession of this retired and unpretending Scottish baron, though laid aside among his papers, and never known publickly till now! Professor Playfair, in his Dissertation, sketches the history of the slow progress of this branch of algebra, and shows that the genesis of equations first received a decided explication in the works of Harriot, not published till the year 1631. He adds, "Their slow progress arose from this, that they worked with an instrument, the use of which they did not fully comprehend, and employed a language which expressed more than they were prepared to understand; a language which, under the notion first of *negative*, and then of *imaginary* quantities, *seemed* to involve such mysteries as the accuracy of mathematical science must necessarily refuse to admit." But early and rude as was the period in the history of algebra to which we must refer the composition of Napier's manuscript, we find him treating these mysterious quantities as if he had a perfect command of them, and looking forward with exultation to his future applications of such *great algebraic secrets*. Nothing can be more interesting in the whole history of his studies, than his opening chapters of that redoubtable subject Equations. They prove beyond question that he was among the very first to understand that recondite subject; which he did so thoroughly as to compose a treatise, the fragment of which may be compared with any of the greatest that have succeeded him, from Harriot to Euler. Now this is very striking. The internal evidence is irresistible that Napier composed his algebra before his arithmetic, and geometrical logistic. The progress of his studies appears to have been in this order. Having mastered algebra he conceived the noble project of composing four books embracing every department of numerical science; he returned accordingly to the simplest elements, and with an extensive prospect and command of the vast field before him, he had digested his subject, and "sett it orderlie doun," nearly as far as his original books of al-

gebra, and had even commenced a systematic reformation of the symbolical language of algebra, when the invention of Logarithms interrupted his original plan. This great invention, however, had, it seems, occurred to him before the year 1594, when Tycho got a hint of it from Napier's friend Craig; and, indeed, from his own expressions, we must date his conception of the Logarithms many years before their publication. His treatise on Numbers, then, in which he betrays no idea either of Logarithms or Decimal fractions, must be referred to a very early period, and it is impossible that when he wrote it he could know any thing of the writings of Vieta. "Most of Vieta's algebraic works," says Dr Hutton, "were written about or before the year 1600, but some of them were not published till after his death, which happened in 1603." And this is most material to observe that, "the two books *de æquationum recognitione et emendatione*, which contain Vieta's chief improvements in algebra, were not published till the year 1615;" indeed, his scattered works were only first collected into a volume thirty years after our philosopher's death.

But the historians of science are agreed that, although some important conquests were achieved in that department by Tartalea, Cardan, and a few others, the general theory of equations was only first opened by Vieta, who paved the way for Harriot and Descartes. Montucla says, "The different transformations which may be adopted to give an equation a more commodious form, are, at least for the most part, the invention of M. Vieta, who taught the method in his book entitled *De Emendatione Æquationum*. We there learn how to perform all the operations of arithmetic, addition, subtraction, multiplication, and division, upon the roots of equations. By means of that he causes the second term of an equation to disappear; an operation which at once *resolves* quadratic equations, and *prepares* the cubic. It is thus, too, he causes the fractions to vanish which embarrass an equation, that he delivers it from irrationality when any of the terms are embarrassed thereby; all these things have been adopted by the modern analysts, and form what they call the preparation of equations; after these preliminaries M. Vieta passes to the resolution of equations of all degrees." This is just the object of the two chapters on equations with which, unfortunately, our philosopher's manuscript concludes. The first of them, being the 9th of the 2d book of his aglebra, is entitled "of Equations and their Roots," and the one following is "of the general Preparation of Equations." No more is extant; but in these chapters he refers to succeeding ones, as if already composed, and expressly mentions that, after laying down all the rules of *preparation*, he means to give the methods of *resolution*. Though none of these valuable lucubrations were ever published, and only a fragment has been saved, yet in the history of his own mind, and in estimating the honour he confers upon his country, the fact is most interesting. Euler, of whom those most capable to judge have said, "that he was indisputably the greatest analyst that has ever appeared," concludes the work, by which I have all along tested Napier's, with the theory of equations. So does our philosopher his, and here again the same comparison may be safely challenged. Even in the state in which he left his work,

among his loose papers, and not remodelled and fitted to the first books, as he obviously intended to have done, all that remains of his doctrine of equations is richer in tuition, more systematically arranged, and appears to lay the foundation for a more masterly examination of the subject than the corresponding chapters of Euler's finished work. This pretension is so high that, in order to justify it, I have given the two last chapters of the manuscript entire in the Appendix, and have translated them for the benefit of those who might not take the trouble to read algebra in Latin. In the translation, I have adhered as literally as possible to the original. Some of his terms, and of course his symbolical language, differ from that now in use; but he is so precise and explanatory that, with the aid of the vocabulary already quoted, it is easy for any one acquainted with the history of algebra to follow him. The learned will there find that he is not only anticipating Vieta in what Montucla refers to that philosopher, and from whose merit, of course, Napier's unpublished work cannot detract, but that he is evidently stretching beyond the triumphs of Vieta to those of Girard and Harriot. It is impossible to read his opening chapters of equations, and not admit that they indicate a maturity in the subject for which Vieta is held only to have paved the way. Girard is considered the first in whose work, published long after Napier's death, the refined and difficult doctrine of imaginary quantities and roots assumes a place in science. Our philosopher clearly has this doctrine, and apparently a great command of the subject. The reduction of equations he calls *expositio*, and the root *exponens*. He states how various are those roots; that they are *valida* when prenoted with the sign +, and *invalida* with the sign —; in other words, positive and negative roots. He also defines the nature of an *impossible* equation, with the view of preparing the way for his doctrine of imaginary roots; a doctrine which it is obvious he had profoundly considered; indeed, he lays the foundation for it, as a great algebraic secret not then known, in his chapter of abundant and defective quantities which has been quoted. He also refers to roots of every description, capable of being expressed by number or quantity, or both, or neither; clearly embracing all roots, rational and irrational, real, and imaginary; and then he expressly adds, that "these with their examples shall be amply discussed in chapters 11, 12 and 13,"—the chapters which ought immediately to follow that with which the manuscript abruptly concludes. The terms he so frequently and fearlessly uses of *quantities less than nothing*, and *impossible or imaginary quantities*, all of which have been referred to Girard as their originator, indicate that command of the subject which was not to be daunted by the difficulty of naming such quantities, and that he was prepared to show how the phrases were justified in science. It is also very interesting to observe, that although he does not adopt, as Vieta did, letters for the known quantities, his notation is in some material circumstances beyond that philosopher's. Mr Babbage, in his History of Notation, observes, "it is a curious circumstance that the symbol which now represents equality was first used to denote subtraction, in which sense it was employed by *Albert Girard*, and that a word signifying equality was always used instead *until the time of Harriot*." This sentence, it must

be observed, overlooks the claim of *Recorde*, who, if he did not succeed in establishing the sign of equality, unquestionably proposed it, as I have elsewhere noticed. Napier, however, adopts it, and, with his usual precision, defines it in these words; "betwixt the parts of an equation that are equal to each other a double line is interposed, which is the sign of equation *(signum æquationis)*; thus, 1 R. = 7, which is pronounced, *one thing* equal to seven." To Vieta is ascribed the *vinculum* in algebraic notation, which Girard changed to the *parenthesis*. This, as is well known to algebraists, is used to denote the compound of binomial surds yielding what are termed *roots universal*. The English algebraists, chiefly, use the vinculum, which is drawn above the compound thus, $\sqrt{a+b}$. Napier explains and uses this notation, with the simple variation of drawing the line under the compound. In the 12th chapter of his arithmetic of surds he lays down; "to extract the square root of this quantity $\surd$ Q 48 + $\surd$ Q 28, prefix to this binomial *(huic binomio)* the following radical sign $\surd$ Q, with a period after it thus, $\surd$ Q. $\surd$ Q48 + $\surd$ Q28," &c. and in the 17th chapter of the same book he gives this example, after explaining the notation, "the square root is extracted from this quantity $5 + \surd c2 - \surd Q3 - \surd Q2$, by prefixing the sign of the root universal with a line drawn in this manner, $\surd Q.\underline{5 + \surd c2 - \surd Q.3 - \surd Q2}$." &c. Accordingly, this vinculum will be found frequently used in his equations, and sometimes a vinculum within a vinculum. Yet even later than Vieta that convenient notation was not in constant use. Oughtred adopts the *u* after $\surd$ to denote universal, instead of what is called "the vinculum of Vieta." I can nowhere find in Napier the sign × of multiplication, which Oughtred introduced. In the preparation of equations our philosopher is far in advance of the date of his manuscript. "Harriot," says *Bossut*, "was the first who thought of placing all the terms of an equation on one side, and thus distinctly saw, what Vieta had only pointed out in a confused manner, that in every equation the coefficient of the second term is the sum of the roots taken with contrary signs," &c. But it will be observed that Napier had this mode of preparation, and made much of it. "If," says he, "you transpose all the terms of one side of an equation to the opposite side, the whole will be made equal to nothing, and this is called *an equation to nothing*," &c.

What I have thus imperfectly abstracted from this most interesting relic will enable the world to see that the Inventor of Logarithms was not a mere calculator who had made a lucky hit in a path where others were close behind him; but that had he only published his treatise on Logistic, without having invented the Logarithms, he would have taken the place of Vieta,—have anticipated the triumphs of Harriot—and, at a still earlier period, have placed Britain in the very highest ranks of those countries from which analytical science has received its greatest impulses.

It appears to me unquestionable that Napier composed his Arithmetic, and consequently his Algebra, before conceiving any of those mechanical inventions in aid of calculation, of which his own account has been given in the preceding memoirs. His

Rabdologia and his Promptuarium would otherwise have been frequently and prominently referred to. * In the former of these inventions, so well known under the name of *Neper's Bones*, the philosopher's object was to reduce the labour of multiplication and division to the less laborious operations of addition and subtraction,—to make the *primatives* do the work of the *derivatives*. From the moment he commanded the genealogy of numbers, this seems to have been his constant endeavour. "Napier," said poor Pinkerton, "was not a great inventor, he was only a useful abbreviator of a particular branch of the mathematics." But it was the *power* of his mind that impelled him to this. The finest geniuses are they who have felt most intensely the trammels of calculation. Many a man passes for a great mathematician, because he is a huge computer. Hutton and Maseres were *great calculators* rather than *great mathematicians*. When their pages were full of figures and symbols they were happy; and they took up the subject of Logarithms, *con amore*, from the very love of that labour to which the Logarithms were opposed. Archimedes and Napier were *anti-calculators*. But Napier alone, of all philosophers in all ages, made it the grand object of his life to obtain the power of calculation without its prolixity. At whatever period, therefore, our philosopher composed his minor works, they must be regarded with great interest, from the evidence they afford, that, with this object constantly before him, he left no department of numerical science not enriched by his most original genius. They compose a chapter, and no mean one, of his universal system of numbers.

Mr Herschel, in his History of Mathematics, has said, "Napier, struck with the difficulties which encumbered arithmetical computation of any length, and which various circumstances had about that time concurred to place in a very prominent light, after bestowing much fruitless labour on the invention of mechanical contrivances for multiplication and division, rejected this plan, and struck on the happy idea of Logarithms." Yet the great Wolff has devoted an elaborate chapter of his *Elementa Matheseos* to the "*Lamellas Neperianas, quarum ope multiplicationem ac divisionem facilius absolvere licet quam per abacum Pythagoricum.*" The great Leibnitz did not disdain such mechanical inventions, and has referred pointedly to Napier's while praising his own in competition with the machine invented by Pascal. † It is interesting to regard our philosopher as

* The only reference to his minor inventions which occurs in the manuscript tends to confirm this remark. In his chapter entitled "Miscellaneous short methods of Multiplication and Division" this note is marked as an interpolation to a passage regarding short methods of multiplication, "*sive omnium facillime per ossa Rabdologiæ nostræ*," clearly implying that he had not the method when he wrote his Arithmetic. Had Napier lived to finish his treatise on Logistic, it would have been the most splendid work of the kind in existence. His Mechanical Arithmetic, Logarithms, and Decimal Fractions, with all his improvements in notation would have been added to his system; and how much of that system would have been his own!

† "J'ai encore eu le bonheur de produire une machine arithmetique infinement différente de celle de *M. Pascal*, puisque la mienne fait les grands multiplications et divisions en un moment, et sans additions ou soustractions auxiliares; au lieu que celle de M. Pascal, dont on parloit comme d'une

the father of this school too,—a school whose labours are fruitless, just because the Logarithms have superseded their utility, unless, perhaps, we except that Leviathan of an abacus, so fearfully constructed "that the machine can itself correct the errors which it may commit, and that the results of its calculations, when absolutely free from error, can be printed off without the aid of human hands, or the operation of human intelligence" (*Brewster*); and this Mr Babbage is inventing chiefly for the purpose of computing Logarithms. I am inclined to doubt the theory that Napier rejected Rabdologia, and then set himself to seek the Logarithms. From his letter to the Chancellor, a very different idea may be gathered. He appears to say that he contrived such artifices for the special benefit of those who might distrust the *artificial numbers*. There occurs in the work, "*Tabulato anno Domini* 1615," an example, however, that may possibly have been added when he was preparing for the press this profound and elegant little volume, which we are sure Mr Herschel had never looked at when he alighted its contents. Independently of other merits, it is hallowed by the fact, of containing perhaps the earliest chapter upon decimal fractions ever composed in Britain, and under the perfect notation which Napier was the first to adopt.

It is singular, that, after having proceeded so far in the path of numbers, our philosopher achieved his greatest conquest, which lay directly in that very path, and not far before him, by a different and an eccentric route, belonging to an opposite branch of science. The Logarithms should have been the offspring of his Arithmetic and his Algebra. He made them the offspring of his Geometry and his Arithmetic. Instead of prosecuting the arithmetic of powers and exponents, he turned to the geometry of his fluxions and his fluents,—terms unknown till then,—a method strange and startling to the philosophers of his times,—distrusted in another age when once again it reappeared in the hands of Newton,—yet successively productive of the Logarithms and the Calculus. The fact is, that Napier was as fearless and as powerful in geometry as he was in logistic, which accounts for the method he adopted. Who but himself, with the whole system of arithmetic and algebra brought under his control, would, in aid of calculation, have set to work with a flowing point! His fluxionary method was characteristic of the same unfettered genius that commanded the scale on either side of zero, and could even see that quantities, "*impossibiles et nihil significantes*," though revolting in language, were precious in calculation. The application of *arithmetic* to geometry created the science of trigonometry. Napier made the application anew, and revolutionized that science, not merely in its *tables*, but in its *rules*. As a geometrician, therefore, he may almost be said to have been more successful than as an arithmetician, for the Logarithms themselves were

chose merveilleuse, et non pas sans raison, n'etoit proprement que pour les additions et soustractions, qu'on pouvoit combiner avec les batons de *Neper*, comme a fait depuis Mr Moreland."—*Leibnitii Opera*, Tome vi. p. 248.

a geometrical conquest. "As a geometrician," says Playfair, "Napier has left behind him a *noble monument* in the two trigonometrical theorems which are known by his name, and which appear first to have been communicated in writing to Cavalieri, who has mentioned them with great eulogy; they are theorems not a little difficult, and of much use, as being particularly adapted to logarithmic calculation." *

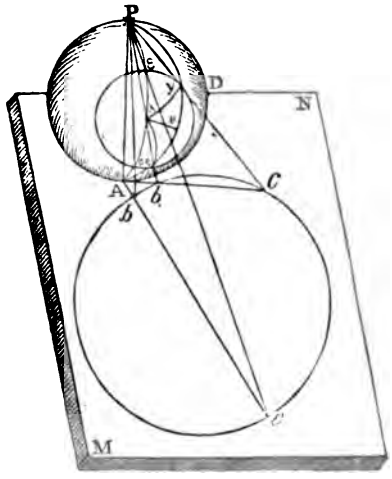
The rules alluded to, generally termed *Napier's Analogies*, are well known to mathematicians. One of his demonstrations is characterized by peculiar elegance and originality. In the optical illustration, we may observe an indication of those habits and acquisitions which led him to revive the lost catoptrics of Archimedes, whose history is given in the memoirs. I shall adopt here the abridgement of it by Dr Minto, referring the reader to the *Canon Mirificus* for the original.

"Let a plane MN touch the sphere ADP at the point A, the extremity of its diameter PA. Upon the surface of the sphere let there be described the triangle $A\lambda\gamma$ acute in γ, or $A\lambda C$ obtuse in C. Let the sine $A\lambda$ and the base $A\gamma$ or AC be produced to the point P. With the pole λ and distance $\lambda\gamma$ or its equal λC let the small circle of the sphere $C\gamma\epsilon\delta$ intersecting λP in ϵ and λA in δ be described: and from λ let the arc $\lambda\mu$ be drawn perpendicular to $AC\gamma$. $A\gamma$ is the sum of the segments of the base and AC their difference. $A\epsilon$ is the sum of the sides and $A\delta$ their difference. Let there be supposed a luminous point in P: The shadows, A, *b*, and *c*, of the points A, C and γ, upon the plane MN, are in the same straight line, because the points A, C, γ, and P are in the same circular plane: also the shadow A, *d*, and *e*, of A, δ, and ϵ, upon the plane MN, are in the same straight line, because A, δ, ϵ, and P, are in the same circular plane. Since PA is perpendicular to the plane MN, the plane triangles PA*c*, PA*b*, PA*e*, and PA*d*, are rectangular in A: therefore, to the radius PA, the straight lines A*c*, A*b*, A*e*, and A*d*, are the tangents of the angles AP*c* or APγ, AP*b* or APC, AP*e* or APϵ, and AP*d* or APδ respectively.

* Professor Powell has also said (*Historical View, &c.* p. 194,) that Napier, before he published his trigonometrical theorems, "communicated them in manuscript to Cavalieri, who mentions them with high commendation." There is, however, a strange mistake here. Napier never corresponded with Cavalieri. That great philosopher was the first Italian commentator upon the Logarithms, but he was only born in the year 1598, as Professor Playfair himself tells us, and as Professor Powell of course repeats. Consequently, when Napier had his rules in manuscript, Cavalieri was an infant, or, at least, a child. Besides, Bonaventura Cavalieri was a Papist! a friar of the order of the Jesuati of St Jerome! And the old Scotch baron, who, God bless him, never communicated the scrape of a pen to any philosopher, would not have sent his theorems to one who was a jesuitical friar. Playfair quotes *Wallis* as his authority; but the passage has been misunderstood. Wallis (*Opera Math.* Tom. ii. p. 875,) says, "*Proportiones sequentes duas Cavalierius acceptas refert Nepero; nec immerito eas dicit altæ indaginis.*" But it is manifest that this means no more than that the Italian philosopher acknowledged that science was indebted to Napier for those rules, which, he adds, evince a lofty genius. The same is also apparent in Cavalieri's great work on Logarithms, of which the editions are dated 1632 and 1643.

This philosopher has the honour of being the first who established the Logarithms in Italy.

But these angles, being at the circumference of the sphere, have for their measures the halves of the arcs intercepted by their sides: therefore Ac, Ab, Ae, and Ad, are the tangents of the halves of Aγ, Aζ, Aι, and Aδ respectively. Now, by optics, the shadow of any circle, described on the surface of the sphere, produced by rays from a luminous point situated in any point of that surface excepting the circumference of the circle, forms a circle on the plane perpendicular to the diameter at whose extremity the luminous point is placed: therefore the points *c*, *b*, *e*, and *d*, are in the circumference of a circle: therefore Ac × Ab = Ae × Ad. Q. E. D."



But it is not merely by his *Analogies* that our philosopher is distinguished in trigonometry. The same object that he constantly pursued in numbers, he struggled to attain in his geometrical path. He determined to enable the student, with the least retentive memory, to carry as it were the whole science of trigonometry in his head, and he actually succeeded. There is not a modern work upon the subject in which *Napier's rule of the circular parts* is not the relief of study, and the theme of praise. If we turn to the most distinguished elementary works we find it said, " the rule of the *Circular Parts* invented by Napier, is of great use in spherical trigonometry, by reducing *all the theorems employed in the solution of right-angled triangles to two.* These two are not new propositions, but are merely enunciations which, by help of a particular arrangement and classification of the parts of a triangle, include all the six propositions with their corollaries; *they are perhaps the happiest example of artificial memory that is known.*" *(Playfair's Elements).* If we turn to the most distinguished philosophical treatises, we find, " these forms are not easily remembered, and, therefore, an artificial memory has been supplied to the student and computist, by rules known by the title of *Napier's Rules for Circular Parts; and in the whole compass of mathematical science, there cannot be found, perhaps, rules which more completely attain that which is the proper object of rules, facility and*

brevity of computation."—(Woodhouse, of Cambridge.) If we turn to the great historians of science the same eulogy is to be met with. *Wallis* expounds the rule, and adds, " this, Napier excogitated for the relief of memory, and Cavallerius, Ursinus, Vlaccus, and our own Gellibrand, Oughtred, Norwood, Ward and Wing, have applied it to various cases." *Montucla* observes, " it would appear that Napier's views always tended to the simplification of practice; among his inventions, one for the resolution of spherical rectangular triangles is especially remarkable, and in the judgment of all acquainted with it extremely ingenious and convenient; indeed those versant in spherical trigonometry know that sixteen cases in spherical rectangular triangles may be proposed, and of these there are ten or twelve so difficult that authors who have written on the subject have been obliged to construct a table to consult for the relief of memory; Napier's rule reduces all these cases to a single rule, composed of two parts, whose elegant form is particularly apt to impress itself profoundly on the memory; hence the English trigonometrists generally adopt it, and I cannot conceal my surprise at scarcely finding a trace of it in various French and Continental treatises upon trigonometry, published since that epoch; M. Wolff, however, has felt the merit of it, and taught it in his *Elementa Matheseos Universalis.*"

No wonder, then, that, with such geometrical powers of invention, our philosopher reached the Logarithms through that path. But it would, indeed, have been wonderful, if, after having done so, he had not, with all his command of numbers, have immediately perceived that the *transcendental* system he had created was not fitted for ordinary calculation, and if he could not have supplied the desideratum. There were various practical inconveniences in his system which it was impossible he could fail to perceive. Above all it was inconvenient and unsuitable, for common operations, to have a system of Logarithms whose fundamental progression was not accommodated to the root, or base, of the arithmetical scale in use. This fact could escape no calculator the moment he attempted to work with the new-born power, and to doubt the fact which Napier asserts, and which Briggs never upon any occasion hesitated to admit, namely, that he (the object of whose life was to increase the power, by simplifying the means of calculation,) had himself observed and provided against that inconvenience, is just as absurd as we have seen that it is unjust. He had only to return from his *geometrical* flight,—which, however, had brought out the lofty system that is the parent of all others,—to his simplest *arithmetical* considerations, in order, as he says himself, " to set out such Logarithms as shall make those numbers to fall upon decimal numbers, such as 100,000,000, 200,000,000, 300,000,000, &c. which are easy to be added or abated to or from any other number." It was the practical inconvenience, and not the algorithm of powers and exponents, that led to this change; a change which itslf first opened the doctrine of fractional exponents.*

* 1000 equals 10 raised to the third power; 10,000 equals 10, to the fourth power; 3 and 4 respectively are the logarithms of those numbers; and, taken as powers and exponents, are written thus, 10^3 10^4. But what is the logarithm of 2000? which, in the modern view of the subject, is the same as

There never was before, or has been since, or can be again, such a destiny in numbers. What could have compensated his country for the suppression of his system of algebra but that he forsook it to invent the Logarithms? Who would not have advised him to turn neither to the right hand nor to the left from that analytical career in which he had triumphed so far? A step or two in notation,—and he had systematically commenced to clear that path,—would have opened to him the arithmetic of exponents,—the Logarithms,—the Binomial Theorem! all of which, from a mind such as his analytical treatise displays, we may safely say nothing but a rude notation veiled. But he was not satisfied with the powerful machinery of integers and fractions, abundant, defective, and imaginary quantities, uninomes and plurinomes, and all the play of radical and cossic signs that he had reduced to obedience. The stars were becoming too many for Tycho and Kepler,—so he determined to attack the numeral scale through another medium. Then what a result—what an episode in his analytical labours—what a corollary to his great design! Having surveyed, and mastered, and nearly digested the whole field of Logistic, so that his unfinished manuscript may compete with Euler's finished production,—having conquered computation and attacked notation, the ARCHIMEDES OF THE NORTH paused, not to rest, but to seek another path of conquest. In that very departure from his algebraic career he brought out, as it were by a single blow, two great sections of the Arabic scale, which had been latent till then, and caused an important end of the exponential system to become the means of developing that very doctrine. Then how thoroughly was the object of his constant study fulfilled in the Logarithms! "By their means it is that numbers almost infinite, and such as are otherwise impracticable, are managed with ease and expedition. By their assistance the mariner steers his vessel—the geometrician investigates the nature of the higher curves—the astronomer determines the places of the stars—the philosopher accounts for other phenomena of nature—and lastly, the usurer computes the interest of his money."—(*Keill.*) But in what age, or in what department of science, can we limit the impulse which the crowning success of Napier's ruling propensity created? "The quadrature of the hyperbola," says another elegant and distinguished philosopher, "was now no longer a matter of mere speculative curiosity. Practical utility was become deeply interested in the investigation by a discovery which the beginning of the seventeenth century produced, but which we deferred speaking of that we might connect it with its *proper link* in the great chain."—"The invention of Logarithms was a most invaluable present to the calculator, but its influence extended still wider. Gregory St Vincent in 1647 had demonstrated the grand property of the hyperbola which connects its area with the logarithmic function; and Mercator, pursuing this subject at length in his *Logarithmotechnia* (1667,) distinctly reduced the construction of logarithmic tables

to ask, what power of 10 is 2000? It must be represented by three integers and a decimal fraction thus, 3.301. It is obvious, therefore, how the common logarithms are connected with the doctrine of *fractional exponents*. So, reversing Dr Hutton's dictum, we may say, that the *invention of Logarithms led to the algorithm of powers and exponents*,—the very path that would have led to them.

to the quadrature of hyperbolic spaces. The unsuccessful attempts of Wallis now came under his contemplation, and what that geometer could not accomplish, Mercator effected by the simple but happy idea of continuing the division of the numerator by the denominator to infinity, as in the decimal arithmetic, and applying the method of Wallis to the series of positive powers which results. The first general quadrature of the hyperbola was thus obtained at the same time that the regular developement of a function in series was now distinctly exhibited."—" Such were the grounds upon which Newton was to raise the mighty fabric of his mathematical discoveries. Previous to the publication of Mercator's series, the perusal of Wallis' work, as himself relates, had led him to consider how the general or indefinite values had afforded that writer his quadrature of the whole circle. This was a work of comparatively greater facility than that undertaken by Wallis, and his undertaking was accordingly successful. It immediately struck him that the same method of interpolation might be applied to the ordinates as to the areas, and, by pursuing this idea, he arrived at his *Binomial Theorem*, which proved the key to the whole doctrine of series."—(*Herschel.*)

I have done my best to illustrate the domestic history—the Christian character—the philosophical power of Napier; and, however rudely the task may have been performed, the world has now a better basis for his eulogy than, perhaps, England's historian was aware of when he called him " the person to whom the title of a GREAT MAN is more justly due than to any other whom his country ever produced."

APPENDIX.

NOTES AND REFERENCES.

Note A.

That the earliest ancestor of the philosopher's, in lineal male ascent, who can be distinctly traced, was the first Napier *of Merchiston*, is proved by an entry in the great Chamberlain Rolls of Scotland, preserved in the Register-House, from which it appears that "Alexander Napare" acquired the lands of Nether-Merchiston by wadset from James I. sometime before the year 1438. The genealogical document transmitted by the first Lord Napier to Sir William Segar is printed in *Hutchins' Dorsetshire*, ii. 48, where the genealogical history of the distinguished English cadets of Merchiston, Napiers of Luton-hoo and Napiers of Morecritchill are given. This author says, "the Napiers of Scotland are also extinct, though the barony of Merchiston still exists in another family, their descendants." This is very inaccurate. The Lord Napier of Merchiston is the lineal descendant of the philosopher, and represents him in his right to the dormant Earldom of Levenax, although he is not lineal heir-male of Napier. But the philosopher is represented in the direct male line by Sir William Milliken Napier of Napier and Milliken, Bart. who has many sons. William Napier, Esq. of Blackstone, of whose hospitable house we wish the same could be said, is also a lineal male descendant of the philosopher's. Besides, are the Generals, and Colonels, and Majors, and Captains Napier, distinguished in the service of their country, and who have scattered "Neper's bones" by sea and land in the shape of their own limbs, to be forgotten as scions of Merchiston? This note was intended to record the Scottish Napiers; but the clan and their gallant deeds are so numerous that I must sum them up in one word, *Carlos da Ponza, Count Cape St Vincent*, who, alas! has no son. For English and Irish Napiers, cadets of Merchiston, see *Collins' Peerage, passim.*

Note B.

I found many interesting genealogical facts, particularly in the records of wills, and the ancient protocols of Edinburgh, regarding the families of Bellenden and Bothwell, for which, however, I must refer the curious reader to those sources.

Note C.

Of many particulars regarding the state of the College of St Salvator, when the philosopher was there, (kindly communicated to me by Dr Lee,) I have only space to insert the names of those under whose immediate tuition he must have been. John Rutherford, Principal. William Ramsay, second principal master. David Guild, third principal master. James Martyn, John Ker, Thomas Brown, John Arthur, Regents.

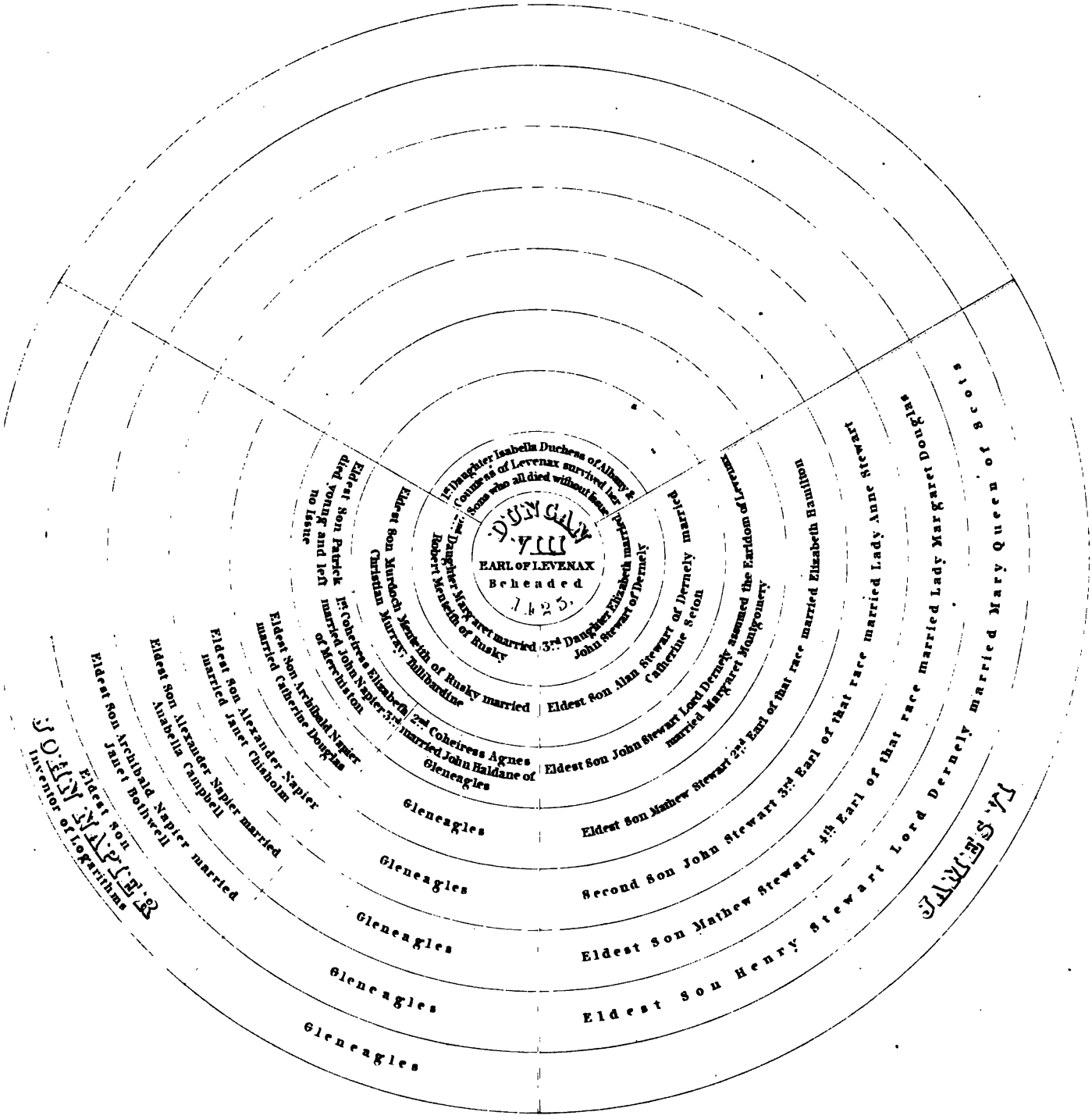
Note D.

The philosopher's reply to the queries of Sir John Skene are, like every thing he composed, characterized by consummate skill and the most unpretending simplicity. The reader will find them in Skene's treatise *De Verborum Significatione, voce Perticata.*

Note E.

The peerage writers have generally recorded that the second wife of the philosopher's father was Elizabeth Mowbray, daughter of ——— Mowbray of Barnbougall. Mr Wood supposed this lady to have been the daughter of Robert Mowbray; but dates and facts have led me to the conclusion that she was the daughter of John Mowbray, Robert's son. Sir Archibald Napier was married to this lady about the year 1571, at which period the laird of Barnbougall was John. In the register of obligations, preserved in the Register House, there is a marriage-contract, dated at Barnbougall, 6th August 1572, "betwixt honarabill persones, Johne Moubray of Barnebougall and *Agnes* Moubray, his dochter, and Maister Robert Creychton of Eliok," &c. John Mowbray had a daughter Elizabeth, who is named in a deed, dated 2d February 1585-6, dividing a provision of 1500 merks among his family. Of this sum, 1460 merks are allotted to John Mowbray's daughter *Marion*, and only 20 to *Elizabeth*, her sister; probably because she was sufficiently provided for by marriage to Sir Archibald Napier. *Agnes* was dead at this time, as appears by a previous deed, dated 14th September 1575. The other sisters were with Queen Mary. The children of John Mowbray were, through their mother, cousins to Sir Archibald Napier. Barbara and Gilles Mowbray were the companions of Queen Mary in her captivity. In "la mort de la Royne d'Escosse," which records the severity of the English government towards the domestics of Mary after her execution, this sentence occurs; "le Baron de *Barnestrudgal, gentilhomme Escossois*, qui avoit *deux de ses filles* en prison, vint à Londres, ou ayant commandement du Roy d'Escosse de parler pour les serviteurs de sa mere, poursuyuit leur deliverance." Mary's funeral took place immediately afterwards, and "Madamoyselle Barbe Maubray" and "Gilles Maubray" are recorded among "les femmes de la Royne d'Escosse," who walked in the pageantry. Barbara Mowbray's tomb at Antwerp records her fidelity to Queen Mary, and the fact that she was the daughter of *John Mowbray, a Scottish baron.* There can be no doubt that *Barnestrudgal* is a corruption of *Barnbougall*; and that Barbara and Gilles were the two daughters whose release from prison the venerable father-in-law of Sir Archibald Napier travelled to procure. For a particular and most interest-

GENEALOGICAL SCHEME


DUNCAN VIII
EARL OF LEVENAX
Beheaded
1425.
1st Daughter Isabella Duchess of Albany & Countess of Levenax survived her Sons who all died without Issue
2nd Daughter Margaret married Robert Menteith of Rusky
3rd Daughter Elizabeth married John Stewart of Dernely
Eldest Son Murdoch Menteith of Rusky married Christian Murray, Ballibandine
Eldest Son Alan Stewart of Dernely married Catherine Seton
Eldest Son Patrick died young & left no Issue
1st Coheiress Elizabeth married John Napier 3rd of Merchiston
2nd Coheiress Agnes married John Haldane of Gleneagles
Eldest Son John Stewart Lord Dernely assumed the Earldom of Levenax married Margaret Montgomery
Eldest Son Archibald Napier married Catherine Douglas
Eldest Son Alexander Napier married Janet Chisholm
Eldest Son Alexander Napier married Anabella Campbell
Eldest Son Archibald Napier married Janet Bothwell
Eldest Son
Inventor of Logarithms
Gleneagles
Gleneagles
Gleneagles
Gleneagles
Gleneagles
Eldest Son Mathew Stewart 2nd Earl of that race married Elizabeth Hamilton
Second Son John Stewart 3rd Earl of that race married Lady Anne Stewart
Eldest Son Mathew Stewart 4th Earl of that race married Lady Margaret Douglas
Eldest Son Henry Stewart Lord Dernely married Mary Queen of Scots

Shewing the PHILOSOPHER'S Representation of DUNCAN VIII Earl of Levenax, and his collateral Relationship to JAMES VI of Scotland.

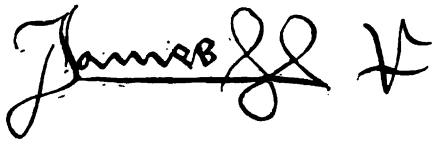
ing account of Barbara's tomb at Antwerp, and the story of *Queen Mary's head*, see *Antiquarian Repertory*, Vol. iii. p. 388. The ill-fated Francis Mowbray was the brother of these young ladies. Barnbougall is now the property of the Earl of Rosbery, but the fine old name is changed to one of no meaning. Bar-na-buoi-gall signifies the point of land of the victory of strangers.

ORIGINAL CHARTERS, &c.

No. I.

[*Extract from the Philde Charter, with fac-simile of the autograph of James II.*]

" JACOBUS," &c. " dedisse, concessisse et hac presenti carta nostra confirmasse dilecto nostro Alexandro Napare nostrorum computorum rotulatori pro continuo et fideli servitio quondam carissime matri nostre Regine impenso, et recompensatione lesionis sui corporis ac gravaminum et dampnorum sibi illatorum tempore proditorie captionis et incarcerationis dicte carissime matris nostre per Alexandrum de Leuingston militem et Jacobum de Leuingston filium suum ac suos complices nequiter perpetrate. Et pro dicti etiam Alexandri Napare fideli servitio nobis impenso et impendendo totas et integras terras nostras de Philde cum pertinentiis jacentes in domino nostro de Methuen infra vicecomitatum de Perth; que terre de Philde ad manus nostras devenerunt ratione forisfacture Alexandri de Leuingston filii dicti Alexandri de Leuingston militis," &c.—" Apud Edynburgh septimo die mensis Marcii Anno Domini millesimo quadringentisimo quadragesimo nono, et Regni nostri decimo quarto."



No. II.

[*Grant from Henry VI. of England to John Napier of Rusky.*]

HENRICUS Dei gratia Rex Anglie et Francie et Dominus Hibernie, omnibus ad quos presentes littere peruenerint salutem Sciatis quod nos bona et gratuita obsequia que dilectus noster Johannes Naper de regno Scotie armigero nobis impendit et in futurum impendere desiderat considerantes de nostra gratia speciali concessimus ei quinquaginta marcas tenendas et percipiendas annuatim pro termino vite sue ad receptum scaccarii nostri per manus Thesaurarii et Camerarii nostrorum ibidem tempore existente ad terminos scilicet michalis et pasche per equales porciones. In cujus rei testimonium has litteras nostras fieri fecimus patentes, teste me ipso apud Edinburgh vicessimo octavo die Augusti, anno regni nostri tricesimo nono. [1461.]

[*No seal or signature.*]

No. III.

Instructionis to be gevin to Schir Alexander Napare of Merchanstoune, Knicht, on the behalve of the King, to be shawin to the Duc of Burgunze, his derrest cousing and confederat.

In the first, to schew to the said Lorde Duc how that the King understands, nocht alanerly be the relations of the said Schir Alexander Napare, the tyme that he cam last fra his said cousing, the gret kindnes and towart dispositione that he has to the King and his realm, but alsa be the hertly and tendre ressaving of his last ambaxate send unto him, and of the gude deliverance of thame, of the quhilk he sal thank his said cousing, praying him of gudely continuance.

Item, to schew to the saide Lorde Duc of [sic] the behalve of the King, that his entent of the sending of his last ambaxat was for to approve and renew the ald confederations and appointmentis made of befor betwix baith thare predecessours, and to conclude apon a certane article of new, tusching the sending of certane men of war upon the expenss of the party requerand, as is mar at lenth contenit in the endenture made betwix baith the commissionars thareuppoun, and evar to haue hade the said confedarations of mar strenth and effect than thai war of befor than of less, nochtwithstanding the Kingis ambassiat, quether reklessly or of necligence he wait nocht, excedit the bounds of thare instructionis, and consentit to ane inconvenient, and concludit tharuppoun; that is to say, that his said cousing the Duc exceppit in his band the King of Ingland, and becaus the King has nane uthir Prince that makis war apon him, he couth nocht fynde the way to appruve nor conferme the said appointmentis; and tharefor, for his part, he has left owt the exceptioun of the King of Denmark, his gude-fader, likeas he has schewin now of late mar at lenth to the ambaxators of the said Lorde Ducis: For the quhilk causs, and to the effect and entent that the King desirs the tendernes and favours of his said cousing, and to pless him sa far as he gudely may with his honour, baith becaus of nerenes of blude and the repar of his liegs and merchands in his lordschippis and tounys in thai partis, he has send to him his treue and famuliar knicht, Schir Alexander Napare, with his letter under his Great Sele, in effect comprehendand baith the auld confederatioun and new in all points and articlis, the exceptioun of the said King of England alenarly left out for the party of the said Lorde Duc, and for the party of the King, the excepping of his gude-fader of Denmark richt swa left owt. Requerand his said cousing the Duc, that gif the forme of the said new confederatioun sent to him be acceptable, that he will ressaive it, and deliver siclike under his Gret Sele to the said Schir Alexander.

Item, to schaw to the said Lorde Duc, and remember how that now of late his ambaxat has bene at the King, desiring ane new abstinence of war and trewis betwix him and the King of Ingland for twa zeris, under certane forme and effect, likeas was con-

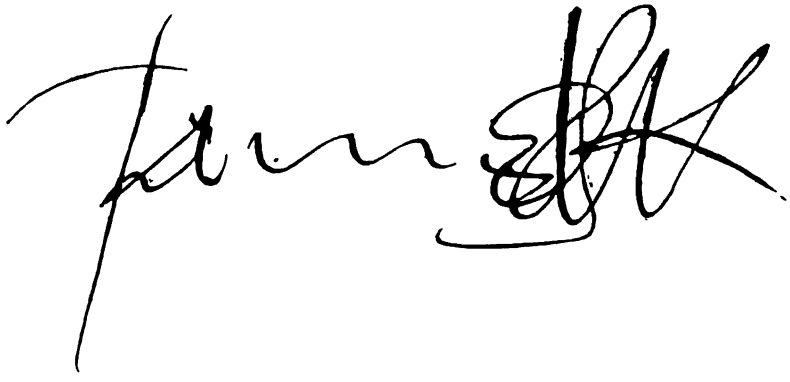
tenit in thare instructonis; and, nochtwithstanding that trewis was taken for lang termez and mony zeris of befor betwix baith the said princes, and that the Kingis lieges, baith be sey and be land, has sustenit gret skaith and dampnage unredressit, and letters of promitt of King Edward and uthers under him bundyn tharfor; nevertheless, becaus it was understanden be the king that the said abstinence and trewis was desirit be the said Lorde Duc, his cousing, for the gude ese and support of him, yet tharefor the King, his cousing, consentit and aggreit thareto at the emplesance of him, the quhilk he wald nocht have done be na manner of way at the instance of the King of Ingland, considering that he and his people remanys plantwiss on him, and Inglismen unredressit.

ITEM, to schaw to the said Lorde Duc, that sen at the emplesance of him his cousing, the King of Scotland has consentit and taken sic trewis with King Edward for the termez desere be him, that tharefor he write his autentik letters with personis of fame and auctorite to the said King Edward, to mak him redress incontinent the bargh broken at Balmburgh, and the laif of the attemptats that ware adiugit to be redressit the last diet haldin at the Newcastel, and sensyne, for thair part, like as the King here is reddy to mak redress for his part; and that he certify King Edward in his said letters, that without redres be made the peple of his realme that ar herijt, hurt, and grevit, cannocht kepe pece in case trewis be never sa sikker bundyn.

Item, to schaw to the Duke that the King traists it is nocht owt of his mynde how that the merchandis of his realme has license of his fader and of himself to cheiss thare stapill within his Lordschippes in ony toune under him; that tharefor he wald remane in the samyn will to his merchandis, and that thai may have his license and gnde will in any toune of his cuntre to chese thar staple, sen thai ar in sumpart grevit in thar previleges in the toune of Bruges, and nocht sa wele tretit be thame as frends suld be, na as thai ar tretit in Scotland quhen thai cum.

ITEM, into the matter of Gelrill, the said Schir Alexander Naper sal schaw, in oure Sourane Lordi's name, to his cousing the Duc of Burgunze, how his grant-schir the Duc of Gelrill, quham God assoilze, wrate til him of late how that his son had cruelly put handis til his person, and takin him and put him in preson, and demainit him, as is wele knawin; for the quhilk his said son, nor nane that mycht cum of him, mycht never apon law succede til his heritage; for the quhilk, sen our Sourane Lord was his eldest dochter son, he exhortit and requirit him that he wald cum in the cuntrie, or send ane of his brethir, and he suld, with the aviss of nobles and baronis of his land, put him in the full possessioune of his said Duchery, sen he knew him nerrest and maist lachfull heretar til him.

And now sen the said Duc is decessit, oure Sourane Lord, quhilk be the informatione of his foresaid grant-schir traistand to have full richt to the succession of the same, will nocht labour na put his hand to the said matter witheute counsale and aviss of his said cousing, the Duc of Burgunze, traisting verraly to have throu him supportatione, aide, and supplie in the said matter, and in the recovering of his richt, as he that is als ner of blude til him as ony uther that pretendis to have interess thairto, and sal be mair thankfull till him, baith in the demeinning of that matter and in al utheris, than ony utheris. Apon the quhilk matter, the said Schir Alexander sal require the said-foure Duc of Burgunze that he will in haisty wise send his entent therapon til oure Sourane Lord, and lat him wyt baith his counsale, directione, and aviss in the said matter, and quhat that he sal traist and lippen therto, sen he has the personage in hand that pretendis to have richt or interess therto.



[*The royal signature (James III.) is repeated in the original, because the last item is on a separate sheet.*]

No. IV.

[*The Philosopher's Theory of Equations literally translated from the unpublished Latin Manuscript.*]

Chap. 9.—Of Equations and their Exponents.

1. Equation is the collation of the uncertain values of *positives* [*the unknown quantities*] with others of equal value, from which the value of the position is demanded. Thus, if for the number or quantity sought any one should place 1 ℞ ignorant of its value, and then, from the hypothesis of the question, should find 3 ℞ equal to 21, thus comparing *three things* with their equals 21, that collation of equality is termed *æquatio;* and from it is inferred, that the value of one thing, or one position, is 7.

2. Betwixt the parts of an equation that are equal to each other a double line is interposed, which is the sign of equation, *(signum æquationis;)* thus $3 ℞ = 7$, which is pronounced, one thing equal to seven.

3. Of equations, some are only of one position, others of more; thus, as an instance of one position, $1 a Q + 3 a = 10$; of more positions, $2 Q - 1 a = 6$.

4. Again, of equations, some are *rude*, and may be reduced to lesser terms, more perspicuous and succinct; others are called most perfect, which are as perspicuous and succinct as possible. Thus, $3 ℞ = 21$ is a rude equation, because it may be reduced into the most perfect form, namely, $1 ℞ = 7$. So $5 a Q = 20$ is a rude equation, because it can be reduced into a more perfect one, namely, $1 a Q = 4$; but $1 a Q = 4$ is also a rude equation, because it may be reduced to one even of the most perfect form, namely, $1 a = 2$; an art of which I shall treat hereafter. So $12 Q + 3 a = 6$ is a rude equation, because it can be reduced into the more perfect one, $4 Q + 1 a = 2$.

5. Again, of equations, some are simple, some quadrate, some cubic, and some higher. Those are called simple which consist of no more than two orders. Thus, $3 ℞ = 27$, or $1 ℞ = 9$; so $5 b Q = 20$, are called simple equations.

6. Of simple equations, some are real, which are things equal to number; others are radical, which are the equation of quadrates, cubics, or any of the higher orders, to number. Thus, $3 ℞ = 21$, or $1 ℞ = 7$; also $1 a = 3$; so $2 ℞ = \surd Q 3 - 1$ are real equations; but $2 Q = 8$, also $3 C = 24$; also $1 a Ss = \surd C 9$, &c. are radical equations.

7. That is a quadratic equation which consists of three proportional orders, thus, $2 Q + 3 ℞ = 4$, or $3 ℞ = 2 Q - 4$; also $1 a Q C - 10 = 3 a Q$; also $12 - \surd Q 1 ℞ = 1 ℞$.

8. That is a cubic equation which consists of four proportional orders, thus $1 C - 9 Q = 24 - 26 ℞$; also $1 C + o Q - 2 ℞ = 4$; this also, $1 a Q C - 2 a Q = 4$, is a cubic equation, because, (according to our *fourth proposition*, c. 6,) collected in this manner, $1 a Q C + o a Q Q - 2 a Q = 4$, it consists of four orders.

9. A quadrati-quadratical equation consists of five, a supersolid of six, a quadrati-cubical of seven proportional orders, and so on of all the higher orders *in infinitum;* thus $2 Q Q - 28 C + 142 Q = 308 ℞ - 240$, is a quadrati-quadratical equation; $1 b Q Ss -$

$4b\,Q\,Q\,Q + 1b\,Q\,C - 3b\,Q\,Q - 1b\,Q = 12$ is a supersolid equation; $1a\,Q\,C - 3a\,Ss + 2a\,Q\,Q - 6a\,C + 1a\,Q = 1a + 6$, is a quadrati-cubical equation.

10. An illusive equation (*illusiva*) is that which asserts an impossibility; and if any one demands an impossibility in an illusive equation, his answer falls; thus $1\,R = 3\,R$ is an illusive equation, seeing it is impossible that any thing can be equal to the triple of itself; also $1\,Q = 4\,R - 5$ is an illusive equation, seeing that no quadrate can equal four things, or its roots, *minus* five; as will be made manifest hereafter.

11. Exposition (*expositio*) is the reduction of a rude equation to the most perfect and real equation, and that part of the real equation which is equal to one thing is called the exponent (*exponens*), and solves the question; thus, when this rude equation $3\,R = 21$, is reduced to this most perfect $1\,R = 7$, the exponent of either equation will be 7, because that is equal to one thing, namely, to $1\,R$. Again, this rude equation $5\,Q = 20$ is reduced to this more perfect one $1\,Q = 4$; then to this most perfect and real equation $1\,R = 2$; now the work of reduction is called exposition, and 2 the exponent, because it is equal to one thing. I shall afterwards teach how the exponent solves the question.

12. Every equation, except an illusive one, has at least one exponent, valid or invalid. I shall teach this hereafter; at present it is sufficient to have premised so much.

13. Valid exponents are those which placed by themselves are noted with this sign +, and are always greater than nothing; but invalid exponents are those which placed by themselves are noted with this sign —, and these are less than nothing, (*minora sunt nihilo*); thus, in this equation $1\,R = 7$, seven is a valid exponent, because (*as by C.* 6, *Prop.* 1, *Lib.* 1,) it is understood to be noted with the copula +; but in this real equation $1\,R = -7$, by parity of reasoning the exponent is termed invalid, because it is noted with the copula —, thus — 7, and is less than nothing.

14. Of exponents, some are capable of being expressed entirely by a single number, others again entirely by a single quantity; some can only be expressed in a single number, some only in a single quantity; some partly one way and partly the other, some in neither way. *These, with their examples, shall be amply discussed in their order in chapters* 11, 12, and 13.

15. Every portion of an equation, subject to one leading sign, is called a term (*minima,*) whatever number of signs and terms there may be; the leading and predominant sign is called the *ductrix*, and the rest are called *intermediæ*; thus in this equation $1\,C - 3 + \surd Q2 + \frac{3\,R - 4}{1\,Q + 1} - \surd Q.6 + \surd Q\,1\,R = 0$, in which $1\,C$ is called a term, and + its ductrix; so 3 is called a term, and — its ductrix; so $\surd Q\,2$ is a term, and + its ductrix; so $\frac{3\,R - 4}{1\,Q + 1}$ is a term, and + its ductrix, *because its power extends throughout the whole fraction*; but the other signs of this fraction are called intermediates; so $\surd Q.6 + \surd Q\,1\,R$ is called a term, and the sign — its ductrix, *because its power extends throughout the aggregate value of the whole universal root*; the remaining sign + is called intermediate.

Chap. 10.—Of the General Preparation of Equations.

1. *Preparation* is the reduction of rude equations to more perfect ones, which are afterwards reduced to the most perfect real equations by exposition; thus $5\,a\,Q = 20$ is first prepared, and becomes $1\,a\,Q = 4$, then it is expounded $1\,a = 2$; the modes of preparation shall now be laid down; the modes of reducing shall afterwards appear.

2. Rude equations are prepared and made conspicuous in five ways; by *transposition*, *abbreviation*, *division*, *multiplication*, and *extraction*. Of these modes the rules and examples follow.

3. If you transfer a term from one part of an equation to the opposite, and prefix the opposite sign as ductrix, the parts are equal, and this is called transposition: as thus in this equation $4\,R_x - 6 = 5\,R_x - 20$, if -20 be transposed from the posterior to the prior part of the equation, and the sign changed in this form, $4\,R_x - 6 + 20 = 5\,R_x$; again, transpose $4\,R_x$, and you have $-4\,R_x$, in this form $-6 + 20 = 5\,R_x - 4\,R_x$; so of this equation $1\,Q - \surd Q\,.\,3\,Q - 2 = 3a$, transpose $-\surd Q\,.\,3\,Q - 2$, it becomes $+\surd Q\,.\,3\,Q - 2$ in this form, $1\,Q = 3a + \surd Q\,.\,3\,Q - 2$; and again, transpose $3a$, that gives $-3a$ in this form, $+Q - 3a = \surd Q\,.\,3\,Q - 2$, and the opposite parts are equal as before.

4. If (as premised) you transpose all the terms of one side of an equation to the opposite side, the whole compound will be made equal to nothing, and this is called *an equation to nothing*; and, by *the 4th prop.* 2 *c.* of this book, ought to be abbreviated: thus, in the above example $4\,R_x - 6 = 5\,R_x - 20$, transpose $5\,R_x - 20$, and you have $-5\,R_x + 20$ in this form, $4\,R_x - 6 - 5\,R_x + 20 = 0$, which abbreviated, becomes $-1\,R_x + 14 = 0$, and is an equation to nothing; so, in the equation $1\,Q - \surd Q\,.\,3\,Q - 2 = 3a$, transpose the left side to the right, and you have $0 = -1\,Q + \surd Q\,.\,3\,Q - 2 + 3a$, which is also an equation to nothing.

5. If the highest unknown quantity have the sign $-$ in front, convert all the ductrices of all the terms, and a more perspicuous equation will be produced; thus, to take the above example, if $-1\,R_x + 14 = 0$, consequently $+1\,R_x - 14 = 0$; so $-1\,Q + 3a + \surd Q\,.\,3\,Q - 2 = 0$ becomes $1\,Q - 3a - \surd Q\,.\,3\,Q - 2 = 0$; so $-1\,R_x - 1 + \frac{32}{1a+1} = 0$ becomes $1\,R_x + 1 - \frac{32}{1a+1} = 0$.

6. If you divide all the unknown quantities of the highest order by unity signed with the positive and radical signs of the same order, and then divide the whole equation by the quotient, a perspicuous equation will arise, having the highest order signed with unity. Thus, in the equation $2\,C - 8\,Q + 6\,R_x = 0$, divide the unknown quantity of the highest order, namely, $2\,C$ by $1\,C$, the quotient is 2; then divide the whole equation by 2, and it becomes $1\,C - 4\,Q + 3\,R_x = 0$; so, in this equation $3\,R_x - \surd Q\,2\,Q - 6 = 0$, the unknown quantities of the highest orders are $3\,R_x - \surd Q\,2\,Q$, which, by 5th *prop. c.* 4 of this book, are of the same order of power, and their order is *of things;* divide, then, $3\,R_x - \surd Q\,2\,Q$ by $1\,R_x$, or (which is the same thing) by $\surd Q\,1\,Q$ and the quotient is $3 - \surd Q\,2$; by this quotient, according to 2 *prop. c.* 11, *lib.* 1, divide the whole equation and you have $1\,R_x - \frac{18}{3} - \frac{\surd Q\,72}{7} = 0$, which, athough it be a fraction, is more

perspicuous than before, in so far as the sign Q is removed; so, to give a third example, $1\,\text{R}\,a + 1\,a + 1\,\text{R} - 31 = 0$, from which, if you wish to expunge and delete the mixed sign, namely, $1\,\text{R}\,a$, divide $1\,\text{R}\,a + 1\,a$, by $1\,a$, or $1\,\text{R}\,a + 1\,\text{R}$, by $1\,\text{R}$, (whichever you wish to receive in the place of the highest order;) for example's sake, let $1\,\text{R}$ be taken; divide, then, $1\,\text{R}\,a + 1\,\text{R}$ per $1\,\text{R}$, the quotient will be $1\,a + 1$, by which divide the whole equation $1\,\text{R}\,a + 1\,\text{R} + 1\,a - 31 = 0$, and the equation becomes $1\,\text{R} + 1 - \frac{32}{1\,a+1} = 0$, which, though a fraction, is more perspicuous than before, in so far as that the mixed sign, which previously was obscure, is removed.

7. If the lowest order of an equation be an unknown quantity, then divide the whole equation by unity signed with the sign of the lowest order, and there arises a perspicuous equation, having an absolute number in the place of the lowest order; thus, divide $1\,\text{C} - 4\,\text{Q} + 3\,\text{R} = 0$, by unity of the lowest order, namely, by $1\,\text{R}$, and it becomes $1\,\text{Q} - 4\,\text{R} + 3 = 0$; so $3\,\text{Q} - \surd\,\text{Q}\,2\,\text{R} = 0$ divide by $\surd\,\text{Q}\,1\,\text{R}$, and this equation is obtained, $\surd\,\text{Q}\,9\,\text{C} - \surd\,\text{Q}\,2 = 0$, of which the last series is always number.

8. If any particles of an equation be true fractions, multiply the whole equation by their denominators, and there will be produced an integral equation more perspicuous; thus, in this equation $\frac{6\,\text{R} - 8\,\text{Q}}{1\,\text{C} + 3\,\text{R}} + 2 = 0$, there is a true fraction, though abbreviable; multiply then the whole equation by the denominator $1\,\text{C} - 3\,\text{R}$ and you have $2\,\text{C} + 12\,\text{R} - 8\,\text{Q} = 0$; so, multiply this equation $1\,\text{Q} + \frac{2\,\text{R}}{3} - \frac{88}{75} = 0$ by 3, and you have, in the first place, $3\,\text{Q} + 2\,\text{R} - \frac{264}{75} = 0$; multiply this again by 75, and you have $225\,\text{Q} + 150\,\text{R} - 264 = 0$, which are integral equations freed of fractions.

9. If there be in an equation a single root universal, separate it from the rest of the equation, *(3d prop.)* then multiply each side of the equation together as often as the sign universal denotes, and there will be produced a more perspicuous equation, for it will have no universal signs; thus $2\,\text{Q} + 3\,\text{R} - \surd\,\text{Q} \,.\, 12\,\text{C} + 4\,\text{Q}\,\text{Q} + 18 = 0$, first, by transposition, becomes $2\,\text{Q} + 3\,\text{R} = \surd\,\text{Q} \,.\, 12\,\text{C} + 4\,\text{Q}\,\text{Q} + 18$; then let the sides be squared, because the sign universal is $\surd\,\text{Q}$. and they become $4\,\text{Q}\,\text{Q} + 12\,\text{C} + 9\,\text{Q} = 12\,\text{C} + 4\,\text{Q}\,\text{Q} + 18$; and, consequently, being transposed and abbreviated, become $1\,\text{Q} = 2$: To give another example; $\surd\,\text{C} \,.\, 2\,\text{R} - 6 = 3\,\text{R}$ the sides being cubically multiplied, become $2\,\text{R} - 6 = 27\,\text{C}$; otherwise, $2\,\text{R} - 27\,\text{C} - 6 = 0$.

10. If an equation consist of two roots universal similarly radicated, without any other terms, let them be separated by transposition, and multiplied together as often as the sign universal denotes; and a perspicuous equation will be produced, free of roots universal: thus let $\surd\,\text{Q} \,.\, 2\,\text{R} + 5 - \surd\,\text{Q} \,.\, 3\,\text{R} - 4 = 0$ be separated, and they become $\surd\,\text{Q} \,.\, 2\,\text{R} + 5 = \surd\,\text{Q} \,.\, 3\,\text{R} - 4$, which quadratically multiplied become $2\,\text{R} + 5 = 3\,\text{R} - 4$, and, by transposition and abbreviation, $1\,\text{R} - 9 = 0$.

11. If an equation consist only of two roots universal, dissimilarly radicated, let the universals be separated, and let each side be multiplied together, according to the quality of each sign of the dissimilar universals, and a perspicuous equation, free of universals,

will come out; thus, let $\surd Ss.3Q+6-\surd Q.2R-3=0$ be first separated by transposition in this manner, $\surd Ss.3Q+6=\surd Q.2R-3$; then let the sides be *quadrati-supersolide* multiplied together, and they become $32Ss-240QQ+720C-1080Q+810R-243=9QQ+36Q+36$, which transposed and abbreviated become $32Ss-249QQ+720C-1116Q+810R-279=0$.

12. If there be two roots universal squared with other simple quantities or uninomes in an equation, separate both the universals with their signs from the rest, and multiply quadratically the two sides together, and an equation comes out, consisting of only one root universal, which also may be removed by *prop.* 9 *of this chapter*: thus, if this equation $\frac{1}{2}+\surd Q.\underline{48\frac{1}{4}+1R-1Q}+\frac{1}{2}R-\surd Q.79-\frac{3}{4}Q=0$, be transposed in this manner, $\surd Q.79-\frac{3}{4}Q-\surd Q.\underline{48\frac{1}{4}+1R-1Q}=\frac{1}{2}R+\frac{1}{2}$, then each side being squared become $127\frac{1}{4}+1R-1\frac{3}{4}Q-\surd Q.15247+316R-460\frac{3}{4}Q-\surd C+3QQ=\frac{1}{4}Q+\frac{1}{2}R+\frac{1}{4}$; transpose and abbreviate this, and it becomes $\surd Q.15247+316R-460\frac{1}{4}Q-3C+3QQ=127+\frac{1}{2}R-2Q$, which finally, by *prop.* 9, become $1QQ+1C-47Q-189R+882=0$.

13. If an equation consist of three roots universal squared, without any other terms, let the two quadrates be separated from the rest by transposition, and the sides be squared, and an equation will be produced of only one universal, to be deleted by *prop.* 9: thus, let the equation $\surd Q.3R+2+\surd Q.2R-1-\surd Q.4R-2=0$, be separated in this manner, $\surd Q.3R-2+\surd Q.2R+1=\surd Q.4R+2$; let the sides be squared, and they become $5R-1+\surd Q.6Q-1R-2=4R+2$; then, by abbreviation, they become $\surd Q.6Q-1R-2=3-1R$; afterwards, by *prop.* 9, they beome, $6Q-1R-2=1Q-6R+9$; and finally, $5Q+5R-11=0$, otherwise $1Q+1R-2\frac{1}{5}=0$.

14. If an equation consist of three universals squared, with one uninome or simple quantity; let two universals be transposed from the rest, and the sides squared, and an equation is produced of two roots universal to be removed by *prop.* 12: thus, let the equation $\surd Q.\underline{\surd C\,2R+3}+\surd Q.3R-2-2R-\surd Q.\underline{2Q+1}=0$, be transposed in this manner, $\surd Q.\surd C\,2R+3+\surd Q.3R-2=2R+\surd Q.2Q+1$; let the sides be quadratically multiplied together, and they become $\surd Q.\underline{\surd C\,3456\,QQ-\surd C\,1024R+36R-24}+\surd C\,2R+3R+1=6Q+1+\surd Q.\underline{32QQ+8R}$, consisting of two universals squared, to be deleted by *prop.* 12.

15. If an equation consist of four universals squared, without other terms, let two from two be separated by transposition, and the sides squared, which will produce an equation of only two universals to be deleted by *prop.* 12: thus, let the equation be transposed in this manner, $\surd Q.\underline{5Q-2R}-\surd Q.\underline{10-1R}=\surd Q.2R+6+\surd Q.1Q+4$; the sides being squared, give $5Q-3R+10-\surd Q.208Q-20C-80R=1Q+2R+10+\surd Q.8C+24Q+32R+96$; which consist only of two universals, to be deleted by *prop.* 12.

16. If a single *universallissima* on one side be equalled to a *universallissima* alone, whether

on the other side there be a universal alone, or a universal and uninome together, or uninomes or simple quantities only, multiply the sides together to the qualities of the universal signs, and the *universallissima* sign will be removed, the other universals being removed by the preceding rules: thus, in this equation $\surd Q.10 + \surd Q.5R - 2 = \surd Q.3 + \surd Q.3R + 1$, *universallissima* is equalled to *universallissima*; let the sides be squared, and they become $10 + \surd Q.5R - 2 = 3 + \surd Q.3R + 1$, or $7 + \surd Q.5R - 2 = \surd Q.3R + 1$; of which you may delete the universals by *prop.* 12. Another example is as follows: Of the equation $\surd Q\,Ss.3 + \surd Q.2R - 1 = \surd C\,Ss.5 + \surd Q.3\,\mathfrak{R} - 4$ let the sides be multiplied together *quadrati-cubice-supersolidè*, and they become $18\,\mathfrak{R} + 18 + \surd Q.8C - 12Q + 6\,\mathfrak{R} - 1 + \surd Q.1458\,\mathfrak{R} - 729 = 21 + 3\,\mathfrak{R} + \surd Q.300\,\mathfrak{R} - 400$, or $15\,\mathfrak{R} - 3 + \surd Q.8C - 12Q + 6\,\mathfrak{R} - 1 + \surd Q.1458R - 729 = \surd Q.300R - 400$, of which the universals cannot be deleted. A third example is as follows. Of the equation $\surd C.3 + \surd Q.2R - 1 = \surd C.20 - 4R$ multiply the sides together cubically, and they become $3 + \surd Q.2R - 1 = 20 - 4R$, or $\surd Q.2R - 1 = 17 - 4R$, of which you will delete the universal by *prop.* 9.

17. By the same propositions which have been laid down for deleting universals, so may simple irrationals, betwixt rationals, be transposed, multiplied, and then deleted; thus, let the equation $12 - \surd Q\,1R = 1R$ be separated in this manner $12 - 1R = \surd Q\,1R$; then the sides quadratically multiplied together become $1Q - 24R + 144 = 1R$, or $1Q - 25R + 144 = 0$, which are entirely rational. Therefore, what has been said of universals in propositions 9, 10, 11, 12, 13, 14, and 15, must be understood to apply to simple radical quantities.

18. If not prepared as above, there is another mode of preparing these equations; for the multiplication of simple irrationals for the most part exhibits more roots than required; thus, to take the foregoing example, $12 - \surd Q\,1R = 1R$, multiplied as above, returns the equation $1Q - 25R + 144 = 0$, which has two valid [positive] roots, namely, 16 and 9, when truly the principal equation itself $12 - \surd Q\,1R = 1R$ has only one root, namely, 9, *as afterwards will appear;* therefore, that principal equation, unless prepared according to *prop.* 17, may be better and more simply prepared by *prop.* 20 hereafter, as will there be shown.

19. If, from an equation to 0 there be extracted any true root, (that is, leaving no remainder,) that root will be a more succinct equation to 0; thus, from the equation $1C - 6Q + 12R - 8 = 0$ extract the true cube root, namely, $1R - 2 = 0$, which will be an abbreviated and succinct equation; so from the equation $1R - \surd Q\,36R + 9 = 0$ extract the square root, which will be true (*by Cap.* 8,) namely, $\surd Q\,1R - 3 = 0$, being a more succinct equation.

" Ther is no more of his algebra orderlie sett doun."—(*Note by Robert Napier to Henry Briggs.*)

No. V.

[KEPLER'S LETTER.]

Illustri et Generoso D. D. Joanni Nepero, Baroni Merchistonij, Scoto. S. P. D.

Cœpi superioribus annis in vestibulis Ephemeridum Lectores de Tabularum Rudolphinarum statu certiores reddere, causasque explicare morarum quas illi crebris et literis et publicis scriptis increpabant: Hac vice, Te, Illustris Baro, compello, seorsim quidem à cæteris, quia sic postulat res ipsa, et liber tuus, cui titulus, Mirificus Logarithmorum Canon: publicè tamen, quia quæ tecum confero, illa ad omnium lectorum notitiam pertinent.

Quòd igitur moris meis rursum unus accessit annus, præter generales illas quæ hactenus me impedierunt, singulares etiam in hunc annum causæ concurrerunt: quarum aliquas fama publica loquitur, Bella et cometas, aliquas prædixi aut tetigi in vestibulis Ephemeridum in annos 1617 et 1619, quæ anno 1618 prodierunt; scilicet editionem librorum V. Harmonices Mundi: quæ sola editio (ut non adnumerem præcedentem illorum elucubrationem) me per annum solidum tenuit occupatum; absoluta tamen est, favente supremo Mundi totius Harmosta, necquicquàm fremente et infrendente et horridè admodum interstrepente Bellonâ cum Bombardis Tubis et Taratantaris suis: ut nisi nos etiamnum vel hæc Diva obsederit domi forisvè, vel Mercurialium tergiversationes destituerint, (ut accidit in altera parte Epitomes seu doctrinâ Theoricâ, in quâ Typi non ultra primam paginam progressi conquieverunt hactenus:) exemplaria tam Harmonicorum, quàm descriptionis Cometarum (quæ jam in tertiam mensem hæret Augustæ) his Autumnalibus nundinis Francofurto habere possint ij, quibus cordi est, Opera manuum Dei, mentis lumine collustrata, penitus intueri.

Princeps verò causa, quæ progressibus meis in condendis Tabulis hoc anno intercurrit, est, nova planè sed fœlix calamitas Tabularum partis à me jam dudum perfectæ liber scilicet ille tuus, Illustris Baro; quem Edimburgi in Scotia impressum ante annos V., primùm vidi Pragæ ante biennium; perlegere tamen non potui: donec superiori anno, nactus libellum Benjaminis Ursini, mei dudum domestici, nunc Astronomi Marchici (quo ille rei summam ex tuo libro transcriptam verbis brevissimis comprehendit) quid rei esset cognoscerem. Vix autem uno tentato exemplo, deprehendi magna gratulatione, generale factum abs te exercitium illud numerorum, cujus ego particulam exiguam jam à multis annis in usu habebam, Tabularumq. partem facere proposueram; præcipuè in negotio Parallaxium et scrupulorum durationis et moræ in eclipsibus, cujus methodi exemplum hæc ipsa Ephemeris exhibet. Sciebam equidem, illi meæ methodo locum non esse, nisi ubi arcus á rectis nihil sensibile differrent: at illud ignorabam, ex secantuum excessibus fieri posse Logarithmos, qui methodum hanc universalem faciant, per omnem arcuum longitudinem. Satagebat igitur animus ante omnia videre, num etiam exquisiti essent in Ursini libello Logarithmi. Usus igitur opera Jani Gringalleti Sabaudi, domestici mei, jussi millesimam sinus totius aufêrre; à residuo rursum millesimam, idque plùs quàm bis millies; donec de sinu toto restaret pars decima circiter; sinûs, verò, qui ami-

sisset millesimam totius, Logarithmum curiosissimè constitui, orsus ab unitate divisionis illius quâ Pitiscus utitur numerosissimâ, quippe duodecim ordinum: hunc sic constitutum Logarithmum adnumeravi residuis omnium substractionum ex æquo. Itaque deprehensum est, ad rei summam nihil illis deesse Logarithmis; errores verò incidisse pauculos, vel typi, vel in distributione illa minuta Logarithmorum maximorum circa principium quadrantis. Hæc te obiter scire volui, ut quibus tu methodis incesseris, quas non dubito et plurimas et ingeniosissimas tibi in promptu esse, eas publici juris fieri, mihi saltem (puto et cæteris) scires fore gratissimum; eoque percepto, tua promissa folio 57, in debitum cecidisse intelligeres.

Nunc ad tabulas propiùs. Vix tandem enim hoc ipso Julio mense Linciusm allato exemplari libri tui, ut ad fol. 28 legendo perveni: considerare cœpi occasione tui consilii; num fortasse sufficiant solæ epochæ, et deductiones motuum mediorum, et magnitudines Eccentricitatum semidiametrorumque et tui Logarithmi; æquationum verò tabulæ penitus possint omitti, quippe quæ meris additionibus vel substractionibus facilime perficiantur? Atqui res habet paulò aliter. Primum, non omnis molestia cum multiplicatione et divisione sinuum sublata est: restat etiamnum attentio et cautelæ variæ, circa usum additionum et divisionum, quæ succedunt sublatis; ubi non tantum hebetiores, sed enim ingeniosissimos interdum contingit hallucinari: quibus utrisque tam ad sublevandam memoriam, quàm ad redimendum tempus, succurrendum est per tabulas æquationum, quæ summam ejus, quod Logarithmorum tractationibus elicitur, proximis numeris debitam, statim ad primum intuitum exhibeant. Sanè quo consilio Logarithmos ipsos in libello communicamus, cùm possent illi computari ab uno quolibet modum edocto, idque longè faciliùs quàm sinus, eodem consilio et tabulas condimus æquationum. Deinde cùm duæ sint classes, prior eccentri æquationum, posterior Orbis magni (seu Ptolemæo, Epicycli:) neutrobique neque eccentricitates, neque semidiametri, quod tu præsupponis, constantem tuentur magnitudinem; frustrà hic respectamus antiquam formam; Braheanæ nos observationes aliud docuerunt. Vera quidem itineris planetarii eccentricitas constans est; at æquantis (veteribus dicti) eccentricitas, si quis hac potius, quam meâ formâ computandi, velit uti, variabilis erit perpetuò: aut non exacta nec naturæ vestigiis insistens prodibit altera pars equationis. Rursum semper quidem est eadem maxima orbitæ planetariæ diameter: at non omnes diametri per omnem ambitum sunt æquales, quippe orbitæ planetarum sunt ellipticæ. Quod verò attinet classem æquationum alteram ibi neque orbis magni neque Epicycli Ptolemaici semidiametri constans usurpari potest; h. e. ut ad formam loquar astronomiæ reformatæ, variabilis est distantia Solis à Terrâ, variabilis et distantia planetæ à Sole: nec potest pro sole punctum aliquod soli vicinum eligi, quod semper distet a terra æqualiter; nisi motum ejus circa terram inæquabilem velimus admittere, majore incommodo. Itaque in triangulo inter terram solem et planetam latera duo data, sunt utraque variabilia. Quâ de causâ ratio talis mihi fuit ineunda hactenus, ut duæ essent pro uno quolibet planeta tabulæ, altera indicis (intellige indicem proportionis, datorum laterum summæ ad differentiam) altera anguli (Elongationis a Sole) cum indice et anomaliâ commutationis excerpendi.

Hæc illa pars est tabularum, ad tuos Logarithmos reformanda. Nam si meos exhibeam indices, non poterunt ii servire volenti computare per ipsa triangula, nisi is multiplicaverit indicem in tangentem dimidiæ anomaliæ commutationis. At si pro indicibus ponam Logarithmos, ii tantummodò adduntur ad ejusdem dimidiæ anomaliæ medium Logarithmicum. Indices igitur convertendi sunt in Logarithmos; ut quod singuli sæpissimè facere deberent, detrahere scilicet Logarithmum summæ laterum a Logarithmo differentiæ: id a me uno semel fiat. Anguli vero tabula de nova est condenda, et accommodandæ areæ seu elongationes a Sole, ad æquales saltus Logarithmorum; quæ prius respondebant æqualibus saltibus indicum. Quo ratione et responsus utrinque æquabilior, et tota Tabula Anguli brevior multo fieri poterit: manebitque forma cruciformis ingressus, et correctio per partem proportionalem, usitata hactenus, pro iis, qui ea volent esse contenti. At cum omnis cruciformis excerptio, ob multiplicationem logisticam duplicem, sit tædiosa et cerebrosa: logista illam effugere poterit per tractionem Logarithmorum expeditissimam, quippe accuratis Logarithmis opus erit minimè: nihiloque minus tabula anguli, summam quæsitæ proximam ob oculos statuens, logistam in usu Logarithmorum non patietur aberrare. Multò verò maximâ solicitudine circa latitudines me liberant tui Logarithmi: absque his enim si fuisset, duorum alterum necessarium fuisset, aut ut Logistam ad parallacticam meam remitterem, insertam meæ astronomiæ parti opticæ, imperato duplici quadrato ingressu, verius duplici cruce, nec id satis accurato successu: aut certè, ut duas insuper pro quolibet Planeta conderem tabulas latitudinis æquè prolixas prioribus: unam indicis latitudinarii, alteram latitudinis ipsius. Opus ipsum longissimi temporis et fastidiosi laboris, usus ejus intricatus fuisset. AT NUNC MELIUS EST. Facile per data, duos excerpemus Logarithmos, eorumque differentiam addemus medio Logarithmico inclinationis locorum eccentri, quod exhibebitur ex tabulâ cujusque planetæ; summa confecta, ut medium Logarithmicum, ex Canone exhibebit latitudinem: scrupulosis Logarithmis opus erit rarissimè. Et ne quis dubitet, hoc equidem artificio Ephemeris ista confecta est; eoque tibi, Illustris Baro, jure inscribitur. Ita Logarithmi tui necessario pars fient tabularum Rodolphi; prius tamen in officina mea recusi: eritque cur sibi gratulentur astronomici de moris meis. Tu si quid commodius habes, ejus me quæso participem primo quoque tempore facito; quod item et Astronomiæ Professores, ut dudum privatis literis aliquos, sic nunc publicè universos, rogatos volo. Vale Illustris Baro; et hanc compellationem, ab inferioris conditionis homine, ex usu communium studiorum æstima. Lentiis ad Istrum. V. Cal. Sextiles Anno MDCXIX.

Illustris generositatis tuæ observantissimus,

JOANNES KEPPLERUS.

No. VI.

Reply to some Erroneous Historical Passages relating to Levenax and Menteith.

THE most remarkable fact in the history of our Philosopher's lineage is one little known, but possessing no slight degree of historical interest. He was, through a female, *de jure*, an Earl of that ancient race of LEVENAX, from which his family, as stated in the Memoirs, claimed a lineal male cadency. By a royal deed, dated at Edinburgh 26th March 1455, and still preserved among the Merchiston papers, James II of Scotland bestowed upon John, the son and heir of his master of household, Sir Alexander Napier, the *maritagium* of Elizabeth Menteith. That is to say, the King gifted him with the casualty of her marriage, due, by the feudal customs, to the sovereign superior in consequence of the succession of the daughters of Sir Murdoch Menteith to the family estates. The gift was, in fact, part of the settlements of a marriage which took place not long afterwards. The young lady was one of two very interesting and high-born wards whose persons and estates had come, by feudal incident at that time in full force, under the guardianship of King James, about the middle of the fifteenth century. Elizabeth and Agnes were the sole surviving children, and consequently co-heiresses, of Sir Murdoch Menteith of Rusky, son of Sir Robert Menteith, and Lady Margaret, second daughter of Duncan eighth Earl of Levenax. Sir Murdoch was heir-male of those Earls of Menteith whose honours, which flowed in a female line of succession, set so deeply in blood upon the same scaffold where the venerable Earl Duncan died. Thus these young ladies came to inherit between them one-half of the whole comitatus of Levenax, besides goodly baronies in "the varied realms of fair Menteith."

Our best historians have sadly confused the history of the Levenax. Not to mention others of less note, Dr Robertson tells us that Earl Duncan beheaded by James I. was *forfeited*, and his *possessions added to the crown*. Mr Tytler, whose excellent history is still in the course of publication, has adopted the error of Dr Robertson. "These executions," says he, "were followed by the *forfeiture to the crown*, of the immense estates belonging to the family of Albany and to the *Earl of Lennox;* a seasonable supply of revenue," &c. (iii. 227.) No authority is quoted by these historians in support of their assertion, and it is curious to observe the careless manner in which both of them again introduce an Earl of Lennox upon the restless stage of Scotland's miserable commotions, without any explanation of the revival of the honours, and at periods too, when, in point of fact, no one had resumed them. But how came the Levenax to pass by inheritance, and be taken by services and retours to this very Earl Duncan, if his estates were forfeited to the crown? This important question our historians have never considered. The truth is, Earl Duncan suffered no attainder in title or estates. There is no proof that he did,—there is *unquestionable* proof that he did not. Of this our limits only admit of a summary notice.

1. Earl Duncan's eldest daughter and heiress, Isabella, was married to Murdoch, eldest

son of Robert Duke of Albany, Regent of Scotland. * By the marriage settlements the comitatus of the Levenax was vested in this lady, in the event of her father leaving no legitimate son, and failing her it vested in her two sisters, as heirs-general of Earl Duncan. Isabella, now Duchess of Albany, was bereft of her father, her husband, and her family, by the executions above-mentioned. In virtue, however, of the family settlements, that lady kept possession of the *whole estates of the Levenax*,—exercised without challenge the rights of feudal chief,—resided on the Island of Inchmurrin in Lochlomond, being the principal messuage,—granted many charters of lands belonging to the comitatus,—and in those charters used the style " Isabel Duchess of Albany and *Countess of the Levenax*," and all this for about thirty years, the period she survived her father.

2. This state of possession was not only not disturbed by the sovereign but expressly acknowledged by him. In the great chamberlain rolls preserved in the Register-House, and bearing date from 16th July 1455, to 7th October 1456,—being the royal accounts in which the King's interests are particularly attended to,—there is an entry which unequivocally declares the King's interest in the lands of the Levenax to be simply that of Overlord,—which expressly recognizes the countess under that title, calling her *antiqua comitissa de Lenax ;* acknowledges the *casualty of relief* to have been paid, and the issuing of a precept of seisin to *the heir ;* and complains of *continued non-entry* at the same time that she is enjoying the fruits.

3. This was not a mere personal indulgence to the Duchess. Her liferent rights having fallen by her death, the comitatus came, not to the crown, but to the representatives of her two sisters ; which representatives made up their titles, and took as *heirs-general* of Earl Duncan, who, as those titles expressly bear, died at *the faith and peace of the King ;* an expression which, under the circumstances, can only mean that that nobleman did not perish for treason, and was not forfeited. The original titles of these representatives are still extant, and were confirmed by successive sovereigns from generation to generation. In virtue of these titles it was that the romantic country, with which our historians have enriched the crowns of the early Jameses, continued to descend through the heirs-general of Earl Duncan. These were the representatives of his remaining daughters, Margaret and Elizabeth, co-heiresses after the failure of the rights of Duchess Isabella. Margaret, the elder, was represented by the family of *Rusky* ; Elizabeth, the youngest, by the family of *Dernely*. Elizabeth *Menteith*, the eldest co-heiress of Rusky, transmitted her lands in the

* Every historian, from Fordun to Mr Tytler, without any exception that I am aware of, has recorded that the Regent, Robert Duke of Albany, died 3d September 1419. I find, however, in the Register of the Great Seal in the Register-House, a charter of confirmation by James I. dated at Edinburgh, August 29, 1430, of a charter " *avunculi sui Roberti Ducis Albaniæ*," which charter of Duke Robert is dated " *apud Falkland, August* 4, 1420, *an. gub.* 15." This clears up a difficulty started by Pinkerton, that in the records the year 1423 is called *an. gub.* 3. of *Duke Murdoch*. Pinkerton explains this by the inference that, although Duke Robert died in 1419, his son Murdoch was not recognized as Regent until 1420.

Levenax, and her right to the earldom, to the Inventor of Logarithms, her lineal male representative. Agnes, her younger sister, transmitted her share to Haldane of Gleneagles; and the lands came to the Earl of Camperdown as heir of entail of Gleneagles. Dernely, who eventually usurped the Earldom of Levenax from the elder branch, Rusky, but still through the semblance of *a service to Earl Duncan*, transmitted that usurped title to James VI.

These proofs rest upon original records extant; and more could be added. But in one word, we put it to historians, how came the Inventor of Logarithms to speak of "my landis in the Lennos," if, as they have recorded, those very lands were *added to the crown* when Earl Duncan died?

Another error has found its way into history in reference to this Earldom, and that is, that Earl Duncan left a *legitimate* son, his heir, who is now represented! This is recorded by Mr Chalmers in that excellent work *the Caledonia*, but most incautiously from an *ex parte* compilation, of a modern date, by an antiquarian lawyer who wrote on behalf of Miss Lennox of Woodhead. The family of Woodhead (now represented by Mr Kincaid of Kincaid) unquestionably descends from *Donald of Ballcorrach*, a son of Earl Duncan. But it is just as unquestionable that he was an *illegitimate* son.

1. According to the proofs already alluded to, Earl Duncan's honours and estates passed to his *daughter*, and in virtue of an investiture wherein she was *expressly postponed* to any legitimate son of her father. Yet the *Donald* in question was then alive, and held lands in the Earldom as the *vassal of his sister, whom he acknowledges for his superior.*

2. The comitatus was afterwards divided between the other daughters of Earl Duncan, as *his co-heiresses*, without challenge from *Donald*, or his lineal male representative, who continued to hold subordinate rights in the Levenax.

3. There is an original charter under the great seal, dated 25th August 1423, and preserved in the Register-House, where Duchess Isabella is styled "HÆREDEM *Comitatus de Lenax.*" Of this date the *Donald* in question was holding lands in the Levenax from his father Earl Duncan.

4. There is an original charter (preserved in the Brisbane charter chest) by Earl Duncan, dated 12th August 1423, and relating to lands adjoining Donald's estate, which is witnessed by "Malcolmo Thoma, et *Donaldo* filius nostris *naturalibus.*" *

5. There is extant an ancient charter seal of this Donald's, which carries the arms of Levenax. But not the *pure* arms, nor yet with the *label* of an heir, but with a star on the centre of the cross. Enough has been said to meet the ridiculous pretension of Woodhead. More might be said; but, in one word, how came the Inventor of Logarithms to possess so much of the Levenax, if Earl Duncan left a *son and heir*, who is still represented?

The claim of Lord Napier to the honours of Levenax has been presented to his Majesty. A case for his Lordship will be published, containing a complete history of the

* Discovered by Mr Riddell. See that gentleman's notes to his Reply to Dr Hamilton of Bardowie.

partition of the comitatus, with the proofs of Dernely's usurpation, and of the seniority of Elizabeth Menteith of Rusky, (through whom Napier claims the Earldom,) to her sister Agnes, the ancestress of Gleneagles. *

Next to his rights in "the Levenax," our philosopher's patrimonial connection with "the Menteith" possesses historical interest. The name of Napier-Rusky is still familiar to those who inhabit the beautiful vale of the Teith. The family of Rusky, the honours of whose eldest co-heiress descended to Napier, flowed from "Sir John de Meneteth," second son of Walter Earl of Menteith, who was third son of Walter, High Steward of Scotland. This lineal ancestor of our philosopher has been most groundlessly maligned; and to remove an idle calumny from the honourable house of Menteith, is to clear history of a blot and a fable. Who, in his reminiscences of nursery lore, is unmindful of the *Wallace wight*, and his false friend the *traitor Menteith?* To the nursery should that fable be confined.

Some vague and scanty expressions of certain old chronicles, furnishing no details, and beyond the reach of cross-examination, had, in the progress of centuries and through the mists of the cloister, become magnified into popular obloquy against Sir John Menteith. The tragic fate of Wallace, moreover, created a predisposition to sacrifice great names to the *manes* of the patriot; and at length our philosopher's ancestor, (called *for the occasion* the bosom friend of Wallace,) obtained infamous celebrity. Lord Hailes, to whom the annals of his country are so deeply indebted,—who may be said to have destroyed a school of chroniclers with us, who, affecting an air of research, were apt to put forth the most unwarrantable assumptions,—Lord Hailes, whose fastidious accuracy, and philosophical impartiality, created a new era in the historical department of Scottish letters,—paused at this popular condemnation of a baron, who ranked so high among the noble and virtuous of his country, and, struck with the illustration afforded of the peculiar vice he laboured to eradicate, recorded his doubts and his dissent. None could more critically appreciate those meagre remnants of ancient chronicles, which have been said to couple the name of Menteith with the most dishonourable odium of the fate of Wallace; but he tested their truth, or *their meaning*, by the authentic facts of the distinguished career of Menteith, and satisfied himself that the slight expressions of chroniclers on the subject must be more rationally explained, than by making that individual baron the scape-goat for the nearly universal inconstancy, and disaffection, by which the nobles of Scotland sacrificed her single patriot. Above all, Lord Hailes scorned the fables of a mendicant minstrel of the fifteenth century, yclept *Blind Harry*, who took the ill-fated Wallace for the hero of his muse. Our great annalist, whose acumen was unrivalled in that walk of letters, at once perceived that to the inventive genius of that rude poet might be traced all the *faitour colouring*

* For the most accurate antiquities of the Levenax, see *Cartularium de Levenax*, edited, with a historical preface, for the Maitland Club, by Mr Dennistoun of Dennistoun, 1833.

cast upon Menteith, which time has served to deepen; and the few remarks he could afford, upon so minute a point in his Annals, are chiefly confined to an *exposé* of the fact that no contemporary authority exists for the prevalent allegation, so essential to the calumny, that Menteith was the *personal friend* of Wallace, and then *basely betrayed him*. "Sir John Menteith," says Lord Hailes, "was of high birth, a son of Walter Stewart Earl of Menteith. At this time the important fortress of Dumbarton was committed to his charge by Edward. That he had ever any intercourse *of friendship or familiarity* with Wallace, I am yet to learn. So, indeed, is said by Blind Harry, whom every historian copies, yet whom no historian but Sir Robert Sibbald will venture to *quote*. It is most improbable that Wallace should have put himself in the power of a man whom he knew to be in an office of distinguished trust under Edward; but it is probable that Wallace may have been committed to the castle of Dumbarton, where Menteith commanded. The rest of the story may have arisen from common fame, credulity, the spirit of obloquy, and the love of the marvellous."—*Annals*, Vol. i. p. 281.

Blind Harry, whose surname has escaped all human record, found an able and enthusiastic editor in Dr Jamieson; no match, however, for Lord Hailes, in the walk of antiquities, to which both were attached. With the natural leaning of an editor, Dr Jamieson, though he candidly admits the fabulous tendency of the minstrel in general, is anxious to redeem the main incident of the poem, and to place it among the stores of authentic history. This he attempts, not by fortifying the fact with proofs, but by challenging the critique of Lord Hailes, in a vein of flimsy and fallacious controversy that is not difficult to answer.—*(See Notes to Dr Jamieson's Wallace and Bruce.)*

Mr Tytler, in his History of Scotland, instead of expanding Lord Hailes's remarks, has treated his readers with an elaborate *rifaciménto* of Dr Jamieson's controversial note, to which he has added nothing of any consequence, except a most unmeasured increase of the disrespectful tone assumed towards Lord Hailes by the editor of Blind Harry. * Our limits are too confined for long quotations and a minute critical exposition. At present no more can be done than to offer what may suffice to justify our remarks.

The case against Menteith is, that he was the *especial friend* of Wallace, and then *basely and meanly betrayed him*,—or there is no case at all. Every reader of Scotch history knows this. Nearly all the nobles of Scotland (including Bruce and Randolph, who were among the noblest,) were, during the feverish state of subjugation under which Scotland suffered, alternately false to their country, and faithless to their conqueror. If

* Mr Tytler's note is prefixed to Volume 1st of his History of Scotland, and commences, "I have elsewhere observed that Lord Hailes is fond of displaying his ingenuity in whitewashing dubious characters; and that, with an *appearance* of hypercritical accuracy in his remarks upon other historians, he is often *glaringly inaccurate* himself." The charge of *whitewashing* is bold from a Tytler. Our historian really adds nothing to the critique of Dr Jamieson. He only quotes in addition two old English chronicles, the *Scala Chronicle*, which actually says nothing to the point at all; and *Langtoft*, which, so far as it is *intelligible*, refers the friendship and treachery, not to Menteith, but to one Jack Short, a retainer of Wallace's.

Sir John Menteith had acted the same part, (which he did not,) still there would be no ground for making him the political traitor *par excellence*. Accordingly, that is not the charge against him. He is charged with peculiar perfidy towards Wallace. He is made the *Judas* of profane history. This is the charge upon which alone Mr Tytler can say, that "it was natural that the voice of popular tradition should continue from century to century to *execrate the memory of such a man.*" This is the charge which Lord Hailes said was not proved, and without proof of which the calumny is baseless. True, certain old chronicles couple, in a few words, the name of Sir John Menteith with the capture of the patriot. But Scotland was then completely under the yoke of Edward, and Menteith was at the head of the executive in the district where Wallace was captured; and held, for England, the castle of Dumbarton, to which Wallace was at first conveyed. This fact is sufficient to account for the names of Menteith and Wallace being so coupled, and for the poetical fiction of Blind Harry. Dr Jamieson admits it to be so, when he says, "But at this time, we are told, (by Lord Hailes,) the important fortress of Dumbarton was committed to his (Menteith's) charge by Edward; here it would seem the learned writer fights the poor minstrel with his own weapons; for I find *no evidence* of this fact in the Fœdera, Hemingford, or the *decem Scriptores;* and Lord Hailes refers to *no authority*, so that there is reason to suspect, to use his own language, that he here 'copies' what is said by Blind Harry, whom no historian but Sir Robert Sibbald will venture to quote; if Harry's narrative be received as authority, it is but justice to receive his testimony as he gave it." The affectation of considering Lord Hailes as having borrowed this important fact from Blind Harry, the very authority he was crushing, can never rank higher than a sneer. We are content to *select* this passage as the test of the critique of Harry's editor. Had the Doctor read the Annals he must have found that Lord Hailes relies upon official records for the fact. He quotes *Ryley, Placita Parlamentaria*, repeatedly, both in reference to the circumstances attending the capture of the patriot, and also the settlement of Scotland at that period. He gives, *in his notes*, extracts from that record, and shows not only that King Edward then appointed Menteith sheriff of that county, but that he had *continued* him in the command of Dumbarton Castle, which Menteith had previously held for England! Which, then, is right? Dr Jamieson with his sneer, or Lord Hailes with Ryley? Let us attend for a moment to *facts and dates*. In the year 1303, Comyn and others assembled a large force before Stirling for the purpose of protecting that fortress from reduction by Edward I. The aged but invincible monarch, who was there in person, dispersed them without difficulty, and Comyn and his followers formally submitted to the conqueror, 9th February 1303–4. At this time, Menteith was still an adherent of Edward's, and not with Comyn. After this victory, Edward assembled a parliament *at St Andrews*, from whence he issued a summons to the garrison of Stirling, which refused to surrender, and that memorable siege commenced on the 23d April 1304. The castle surrendered on the 20th of July following. It was in 1305 that Wallace was captured, and he was executed in London upon the 23d August of that year. Now I find among the transcripts of ancient deeds in the

Advocates' Library, *the grant from Edward I. to Sir John Menteith* of the sheriffdom and castle of Dumbarton; and it calls upon all the subjects of the conqueror to be vigilant in aiding, and faithful in obedience to, Menteith in his important jurisdiction. It is dated *20th March at St Andrews*. No year is mentioned, but unquestionably it is March 1303–4, when Edward was at St Andrews before the siege of Stirling, which occurred in the following month.* This deed appears to have escaped Lord Hailes, but it proves that he was not deceived in his reliance upon Ryley. There, in the meantime, we leave Blind Harry's editor.

Now we venture to say that Mr Tytler would have been better and more safely occupied in redeeming Lord Hailes from such an attack, than in repeating Dr Jamieson. Has our excellent historian himself always carefully read the annals he impugns? We fear he has not, if we may judge from the fact that he has quoted them hastily and inaccurately. There is a spurious chronicle, of which no one can give a distinct account, called *Relationes Arnaldi Blair*, in which it is said that, upon a certain occasion in the year 1298, Menteith, Wallace, and some others, went together in arms upon a warlike expedition. The passage asserts nothing about friendship between Menteith and Wallace, beyond the bare allegation that they were in arms together. Lord Hailes, in his Annals, takes this authority and *destroys it.* He convicts it of anachronism, inconsistency, and improbability; and very properly rejects it as worthless. Now, both Dr Jamieson and Mr Tytler quote this passage against Lord Hailes, meagre and inconsequential though it be, as if it had entirely escaped the observation of the annalist; while the fact is, that he examined the authority *critically*, and his antagonists have not. Again, the object in quoting this authority against Lord Hailes is to establish the fact of *friendship* at one time existing between Menteith and Wallace. This it by no means does, even could it be relied upon. If any thing, it proves a solitary instance of military intercourse or co-operation, but nothing more; and the whole calumny against Menteith depends upon the allegation of a base breach of *private friendship*. Here, again, we are constrained to say, that Mr Tytler has *not read* the Annals. He exclaims, "Hailes has also remarked, that he has yet to learn that Menteith *had ever any intercourse* OR friendship and familiarity with Wallace; yet that Menteith *acted in concert* with Wallace is proved by the following passage from Bower, preserved in *Relationes Arnaldi Blair*." Now what Lord Hailes says is something quite different, though a very little word makes that difference. He says, that he has "yet to learn that Menteith had ever any intercourse OF *friendship or familiarity*," &c. A proof of their having upon one occasion acted in concert would not prove the friendship alleged, but would certainly contradict an assertion of "*no intercourse or* friendship and familiarity;" such proof, however, manifestly would not meet the allegation of "no intercourse *of friendship or familiarity*." Now, *friendly and familiar*

* Wodrow's MSS. Jac. Vol. i. 14, No. 9, referring to the original in the Tower. "*Edwardus*," &c. "*universis et singulis tenentibus cæterisque fidelibus nostris de castro de villa et de vicecomitatu de Dunbretan*," &c. "*custodiam castri villæ et vicecomitatus prædictorum cum omnibus pertinentiis suis dilecto et fideli nostro Johanni de Meneteth nos commisisse noveritis*," &c. "*Dat apud villam Sancti Andreæ xx Martii.*"

intercourse is just what Lord Hailes denies. This he elsewhere shows pointedly by putting the word *friend* in Italics,—an ocular emphasis which I do not find preserved in Mr Tytler's quotation of that passage.

But our historian, with regret we say it, has, in respect of Sir John Menteith, forsaken his true mistress, the Genius of History, to follow that *false Duessa*, partial controversy. He has omitted to record the *historical facts* of Menteith's career. He has recorded that "Sir John de Menteith, a Scottish baron who had *served along with and under Wallace* against the English, *deserted his country*, swore homage to Edward; and employed a servant of Wallace to betray his master into his hands; that he *seized him in bed*," &c. and from these violent assumptions our historian deduces his moral remark, that "it was natural that the voice of popular tradition should continue from century to century to *execrate the memory of such a man.*" But to no redeeming point in the long career of Menteith,—to no circumstance, however authentic and within the pale of legitimate history, which might contradict this mixture of fable and calumny, does he even slightly allude. Let us turn again to facts and dates.

Mr Tytler, in his own history, particularly records the battle of Dunbar gained by the Earl of Surrey in the year 1296; and also the fact that the principal Scottish nobility, there taken prisoners, "were immediately sent in chains to England, where they were for the present confined to close confinement in different Welsh and English castles; after some time the king compelled them to attend him in his wars in France, but even this partial liberty was not allowed them till their sons were delivered into his hands as hostages." But our historian, while he particularizes other nobles, does not record that *Sir John Menteith* was one of these prisoners; and that, so far from there being the slightest evidence that he was among the first to bend to the conqueror, his name does not occur in that degrading document the *Ragman Roll*. There can be no question that this is the true history of Menteith's involuntary allegiance to Edward I. In the *Rotuli Scotiæ* will be found, under date 30th July 1297, the mandate of the English monarch, that the "*magnates*" of Scotland, taken at Dunbar, should be liberated, and have their lands again, as they were *about to perform military service in France and elsewhere*. It will be remembered that this was the expedition in reference to which Edward said to Humphrey Bohun, the haughtiest earl in England, "Sir Earl, by God, you shall either go or hang." *Sir John Menteith* is one of the Scotch nobles particularly mentioned as being released upon the condition of foreign service. Nor is this all. The *Fœdera* afford the very terms of the oath which Menteith was *compelled to take*. Upon the 9th day of August 1297, Comyn was, by the king's command, released *from prison*, and made to swear with his *hand on the holy Scripture*, that he would accompany Edward to France against his enemies, and serve him faithfully according to the terms of a formal written obligation containing the highest penalties; and, moreover, that before the expedition set sail, he, Comyn, should find sufficient security. Immediately follows, in this public record, that an oath to the same effect, and precisely in the same terms, was extorted from *Sir John Menteith*,—"*Eodem*

modo, juravit et literam dedit, et manucaptionem dare promisit, Johannen de Meneteth, frater comitis de Meneteth." Not one word of this is recorded in Mr Tytler's history, although among his charges against Menteith is, that "he *deserted* his country, swore homage to Edward," &c. That monarch returned from the foreign campaign, in which Menteith accompanied him, upon the 14th March 1297–8. During his short absence, Wallace had reached, through a brilliant career of arms, the governorship of Scotland. Edward, upon the 22d July 1298, a few months after his return, met the patriot at Falkirk, where the humbler star of Wallace paled before that of Plantagenet. While most of the Scottish nobles were continually changing sides, I have not been able to discover a vestige of evidence or probability that the services of Menteith were for a moment restored to Scotland, until after the death of Edward I. His oath,—his bond,—his hostages,—the heavy penalties stipulated, are his excuse. Had Bruce so good a one for his fickle conduct? Menteith may even have conceived an affection for his conqueror while serving with him abroad; and, foreseeing no brighter prospect for his unhappy country, have hailed Edward, with abated reluctance, as her king. When and where was his private friendship with Wallace contracted? The patriot only emerged from comparative obscurity after Menteith was a prisoner of war in England! When and where did he serve "with and under Wallace against the English?" The time and occasion alleged by Mr Tytler, following the spurious *Relationes*, is a miserable expedition of fire-raising, a case of creeping arson, said to have occurred in the neighbourhood of Ayr, upon the 28th August 1298. Now it is *incredible* that Menteith could have been engaged in any such expedition a few months after his return from abroad with the king of England, if, indeed, he did immediately return with the conqueror. There is no authority for the fact, except the *Relationes;* and Lord Hailes (though his adversary does not notice it) destroyed that authority, and showed that another is also named by that unknown writer, as a companion of Wallace upon this occasion, who was killed at the previous battle of Falkirk. Aware of this difficulty, and anxious to prove one instance of companionship betwixt Wallace and Menteith, Dr Jamieson endeavours to make out the date in the *Relationes* an error, and to transfer the incident to the time of the treaty of Irvine in 1297. Be it so. Had Blind Harry's editor taken the *Rotuli Scotiæ* along with him, he would have found that of that other date Menteith was a *prisoner of war in England!* Thus the assertion, that Menteith *deserted* his country, and *served under Wallace*, is absolutely inconsistent with the public records, which our historians overlook, while clinging to a legendary fable in the vain hope of discomfiting the father of accurate Scottish history.

But, says Mr Tytler, the memory of Menteith has been naturally execrated from generation to generation! And why does our historian not record the facts (worth a million of his legends) that prove how trusted, honoured, and beloved Menteith was in his own generation *after the death of Wallace?* Again let us turn to facts and dates. By the deed already quoted, of date 20th March 1303–4, it is proved that Sir John Menteith was in the highest favour with Edward I. and was trusted with the most important jurisdiction in

Scotland. This destroys all probability that Menteith, between this period and his return from the foreign campaign, had any dealings with Wallace, far less served with him against *the English*. The patriot was captured within Menteith's jurisdiction, or placed under his charge before being sent to England, where he was executed 1305. Edward I. died 7th July 1307. Edward II. went to the continent about the close of that year, and to a state paper, by which he provides for the quiet of Scotland during his absence, appears the name of Menteith. This indicates that he had not swerved from his oath to Edward I. before that monarch's death. But it is proved by the *Fœdera*, that, in August 1309, Menteith was the leading commissioner for Scotland to conclude a truce with England. He was joined with *Sir Nigel Campbell*. Mr Tytler does not record this negotiation. * But it is most material. It proves that Menteith had taken the earliest opportunity to return to his country after the death of Edward I. released him from his bond; and that he stood in the highest esteem with *both countries*. Had his conduct towards his country, or towards Wallace, deserved execration, Menteith would not have been associated with the King's brother-in-law upon this most important mission. In 1615 Menteith was the companion in arms of Randolph, the King's nephew, in the expedition to Ireland. In 1616, Menteith accompanied the same nobleman on a mission *to England*. Menteith and Randolph were bosom friends, companions in arms, and in diplomacy; and here is Mr Tytler's own translation of Barbour's character of Randolph; "loving honour and loyalty, and *hating falsehood above all things*, ever fond of having the bravest knights about him whom he dearly loved." This companionship of Menteith and Randolph is not to be found in Mr Tytler's history, but is proved by the public records. Menteith is one of the barons who, in the year 1320, signed the memorable manifesto of Scottish independence. Our historian records this spirited appeal with the highest commendation, but does not record that one of the names attached to it is "*Johannis de Menteth custos comitatus de Menteth.*" Menteith was one of the commissioners and conservators of the truce with England at the famous treaty of Berwick in the year 1323. Mr Tytler has not recorded this fact, or indeed any fact in favour of Menteith, who died not long after the above date, without a stain upon his shield. Under the circumstances, his allegiance to Edward I. was no stain at all.

Ancient chronicles, meagre and equivocal in their expressions, some of them English, some of them anonymous, or of doubtful authorship, some of them unintelligible, none

* This was the negotiation with Richard de Burgo Earl of Ulster, 2d and 21st August 1309.—*Fœdera*. It was *before* this, (but after Des Roches's treaty,) namely, 30th July 1309, that Edward, alleging the truce to be broken by the Scots, declared war. It was *after* the negotiation of Menteith and Campbell with De Burgo, that the king of France sent Count de Evreux to Edward, namely, 29th November 1309. Now Mr Tytler omits entirely De Burgo's negotiation—speaks of Count De Evreux's mission as that which immediately followed Des Roches's, and then refers to Edward's declaration of 30th July 1309 as *subsequent* to Evreux's mission which occurred in *November following*. Lord Hailes, on the other hand, is *minutely accurate* with regard to all these transactions. Correct Tytler, Vol. i. pp. 277, 278, by Hailes, second Vol. pp. 28, 29; and by the *Fœdera*.

of them susceptible of being thoroughly sifted upon the point, and the most explicit of them written long after the event, are referred to triumphantly by Dr Jamieson and Mr Tytler, to the exclusion of *legitimate history*. I must here content myself with a single instance of Mr Tytler's aptitude to grasp too hastily at these shreds and patches of dim and legendary records. *Wyntoun*, one of the best of the old chroniclers, but not born for more than half a century after Wallace's death, simply records that Menteith "tuk in Glasgow Willame Walays." This proves nothing. But our historian, in quoting it, also quotes the *rubric* of the chapter which says that Menteith "*dissavit* gud Willame Walays." Now Wyntoun's enthusiastic editor, Mr James M'Pherson, who brought that chronicle into repute, scouts the fable of Menteith's treachery, and adds, "Wyntoun only says that he 'tuk Walays:'" the word "*dissavit*" being the *addition of the rubricator*, and probably from the report then circulating." Mr Tytler does not meet this. As for the evidence said to be afforded by the *Scotichronicon*, 1. It is not contemporary. 2. The scanty expressions attributed to Fordun on the subject cannot with certainty be separated from his continuators and interpolators. 3. If used by Fordun, they show that that prolix chronicler was acquainted with *no details* of Menteith's perfidy, or he would have noted them. 3. Bower, Fordun's alleged continuator and interpolator, is still farther removed from the event. He, too, has given *no details* of the perfidy, and obviously had none to give. 4. The violent tirade against Menteith, contained in the *Relationes*, and by some attributed to Bower, destroys itself; and Mr Tytler has wisely excluded from the pages of his history all the monkish trash, attributed to Bower on the subject of Menteith, to which in his controversial note he makes a vague and general reference. But we take fearlessly, what the antagonists of Lord Hailes have rejected, the *Fœdera* and the *Rotuli Scotiæ*, against the whole field of subsequent chroniclers and popular calumny. The moral principles which influenced one individual towards another, five hundred years ago, the degree of private personal friendship existing between them, and the minute circumstances of action composing the merits of such a case, are just those questions of all others in which even a contemporary chronicler, expressing popular, perhaps his own individual opinion, cannot be relied upon. It is a fatal mistake in a historian to suppose that because an authority is old it must be trust-worthy. Mr Tytler parades his legendary lore as if he had found *charter and seisin* against the Menteith. He arranges his authorities with the air of marshalling veteran, irresistible troops. But, at the best, they are like Falstaffe's tattered recruits,—"ragged old-faced ancients,—nay, and the villains march wide betwixt the legs as if they had gyves on,—there's but a shirt and a half in all their company."

THE END.

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